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ABSTRACT

This course of study specifies skills and concepts in mathematics that are to be taught in the various grades of the Euclid (Ohio) City School System. It is based on the philosophy that the purpose of the mathematics program of the Euclid City Schools is to provide students with the kinds of skills they will need to become productive members of society, and that this purpose shall be accomplished by exposing students to broad instructional objectives. The program goals are listed by mathematical topic for each grade level from kindergarten through grade 6, followed by a scope and sequence for those grades. Similarly, the program goals and a scope and sequence are given for grades 7 and 8. Then program goals are listed for each of the secondary school mathematics courses, followed by a scope and sequence for grades 9-12. (MNS)

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Graded Course of Study
Mathematics

(K - 12)

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Euclid Public Schools
Euclid, Ohio

EUCLID CITY SCHOOLS

EUCLID, OHIO

COURSE OF STUDY

MATHEMATICS K - 12

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September 1982

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Regular Meeting
July 12, 1982

RESOLUTION NO. 82-7-281

COURSE OF STUDY
MATHEMATICS,
K-12 - APPROVE

Moved by Mrs. Turek

Seconded by Mrs. Nurmi

RESOLVED that
the Euclid Board of Education adopt the following graded course of study for mathematics, K-12, in compliance with ORC 3313.60.

Copies of the course of study are available in the office of the Director of Instruction.

Ayes: Mr. Schwegler
Mrs. Turek
Mr. Flowers
Mrs. King
Mrs. Nurmi

Nays: None

GRADED COURSE OF STUDY

MATHEMATICS

INTRODUCTION

It is the purpose of this course of study to specify skills and concepts in mathematics that are to be taught in the various grades of the Euclid City School System.

GRADED COURSE OF STUDY

MATHEMATICS

PHILOSOPHY

It is the purpose of the mathematics program of the Euclid City Schools to provide students with the kinds of skills they will need to become productive members of society. This purpose shall be accomplished by exposing students to the broad instructional objectives contained in this course of study.

GRADED COURSE OF STUDY

MATHEMATICS

PROGRAM GOALS STATEMENT

We endorse the goals as recommended by the National Council of Teachers of Mathematics in their booklet, "An Agenda For Action", as goals acceptable and desirable in the teaching of mathematics in the Euclid City City Schools for grades K-12:

1. That basic skills in mathematics be defined to encompass more than computational facility.

2. That mathematics study be required for all students and a flexible curriculum with a greater range of options be designed to accommodate the diverse needs of the student population.

3. That stringent standards of both effectiveness and efficiency be applied to the teaching of mathematics.

4. That problem solving should be one of our foci in the school mathematics program.

5. That mathematics programs take full advantage of the power of calculators and computers at various grade levels.

6. That the success of mathematics programs and student learning be evaluated by a wider range of measures than conventional testing.

GRADED COURSE OF STUDY

MATHEMATICS

KINDERGARTEN

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Numbers and Numeration

KINDERGARTEN

The Child Will:

1. Compare objects in terms of: identity, size, color, shape, use, and other attributes
2. Understand the meaning of: taller and shorter, longer and shorter, larger and smaller, as many as, more than, less than, and one more than
3. Order objects or sets by: height, length, size, more or fewer members, one more, or one fewer members
4. Assemble sets with 0 through 6 members
5. Identify sets 0 to 6
6. Identify numerals 0 to 6
7. Count to determine no more than five objects, not perceptible at one time
8. Name ordinal positions of: first through fifth
9. Count by rote to 30
10. Order numerals 0-10

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Addition

KINDERGARTEN

The Child Will:

1. Describe the joining of one set to another
2. Dramatize simple stories about joining of sets
3. Use counters to show additive action in simple stories

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Fractions

KINDERGARTEN

The Child Will:

Identify part of a whole unit:

a. One-half
b. One-third
c. One-fourth

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Geometry

KINDERGARTEN

The Child Will:

1. Identify shapes with sides and corners - squares, rectangles, angles and triangles

2. Identify shapes with no sides, corners and circles

3. Learn to identify and make symmetrical designs incorporating the above shapes

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Measurement

KINDERGARTEN

The Child Will:

1. Be prepared for linear measure by recognizing taller-shorter and longer-shorter

2. Learn to order objects or sets by height or length

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Problem Solving

KINDERGARTEN

The Child Will:

Make up number stories

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Applications

KINDERGARTEN

The Child Will:

1. Learn to count groups of pennies
2. Learn to use a bar graph
3. Use and understand the meaning of: all, some, not and, above and below, top and bottom, and up and down
4. Recognize and extend one and two-directional patterns
5. Read a calendar
6. Tell time to the hour
7. Talk about earning and spending money

GRADED COURSE OF STUDY

MATHEMATICS

GRADE ONE

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Numbers and Numeration

GRADE ONE

The Child Will:

1. Use a 1-1 correspondence to decide whether or not sets are equivalent
2. Identify, without counting, the objects in a set containing 0-10 objects
3. Determine if one set has as many, more, or fewer objects than another set
4. Write the numerals from 0-10 to indicate how many objects are in a set
5. Identify the word names for 0 through 10
6. Give the numbers 0 through 10 in order
7. Identify which of two numbers is one greater (>) or less (<)
8. Arrange objects in groups of 10 and record the number of tens
9. Identify and record the numbers of tens when one through ten tens are pictured
10. Write, compare, and order the decade numbers
11. Identify which of two multiples of ten is greater (>) or less (<)
12. Write and order the standard numerals for the teen numbers
13. Identify the number of tens and ones for any number less than 100
14. Write the standard numeral for any number less than 100
15. Identify which of two numbers 10 through 99 is greater (>) or less (<)
16. Count by ones
17. Count by tens
18. Count by fives
19. Count by twos

GRADE ONE

20. Use the word names for ordinal numbers first through fifth

21. Put a sequence of numbers in order from least to greatest or vice versa

22. Compare numbers when one number is named by a number phrase

23. Identify the number that is one greater than or one less than a given number

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Addition

GRADE ONE

The Child Will:

1. Recognize addition with a given pictured situation
2. Use two numbers and + (plus) to describe the pictured situation
3. Identify and give sum of 0 through 12 of the basic facts
4. Use + (plus) to complete sentences that involve sums through 12
5. Write number sentences for pictured situations of addition involving 0 through 12 objects
6. Write number sentences for rebus problems that involve sums through 12
7. Complete basic addition facts through 12 written in horizontal or vertical form
8. Identify families of basic addition facts
9. Use addition to complete addition tables
10. Complete exercises involving sums through 12
11. Find the sum of three numbers written in vertical form
12. Add two numbers without regrouping to find the sums of less than 100
13. Use basic facts to decode a message

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Subtraction

GRADE ONE

The Child Will:

1. Recognize subtraction with a given pictured situation
2. Use two numbers and - (minus) to describe the pictured situation
3. Identify and give minuends of 0 through 12 of the basic facts
4. Use - (minus) to complete sentences that involve minuends through 12
5. Write number sentences for pictured subtraction situations involving 0 through 12 objects
6. Write number sentences for rebus pictures that involve minuends through 12
7. Complete basic subtraction facts through 12 written in horizontal or vertical form
8. Identify families of basic subtraction facts
9. Use subtraction to complete subtraction tables
10. Complete exercises involving minuends through 12
11. Subtract two numbers less than 100 without regrouping
12. Use basic facts to decode a message

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Fractions

GRADE ONE

The Child Will:

1. Identify the number of equal parts in a whole object
2. Identify which of two objects is separated into equal parts
3. Identify 1/2, 1/3, or 1/4 of an object

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Ratios and Proportions

GRADE ONE

The Child Will:

Complete tables that involve counting by ones, twos, fives, and tens

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Graphing

GRADE ONE

The Child Will:

1. Interpret information given in a bar graph
2. Record data and make a bar graph
3. Use ordered pairs to locate positions on a grid

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Geometry

GRADE ONE

The Child Will:

1. Identify three dimensional objects that are the same size and shape
2. Identify triangles, rectangles, circles, and squares
3. Decide if a given line is a line of symmetry for an object

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Measurement

GRADE ONE

The Child Will:

1. Use a nonstandard unit of measure to measure objects and compare their lengths
2. Measure and indicate lengths with an inch ruler
3. Measure and indicate lengths with a centimeter ruler
4. Count the units around a closed figure to prepare for indicating a perimeter
5. Count the square units inside a figure to prepare for indicating area
6. Decide if a container holds about a pint or about a quart
7. Decide if a container holds more than a liter

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Problem Solving

GRADE ONE

The Child Will:

1. Identify the operation associated with a pictured situation
2. Write addition and subtraction equations for pictured situations
3. Write a number sentence to solve a problem and give the answer to the problem
4. Write number sentences for rebus problems

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Applications

GRADE ONE

The Child Will:

1. Tell time to the hour
2. Tell time to the half hour
3. Determine the value of a group of coins from 1¢ to 10¢
4. Indicate the number of dimes and nickels needed for a given amount
5. Count by fives, tens, and ones to find the value of a group of coins
6. Identify which of two groups of coins has the greater value
7. Count by twos to complete a sequence of numbers and pennies and the value of a group of pennies
8. Read, construct, and interpret a monthly calendar
9. Count and compare amounts of money in buying situations

GRADED COURSE OF STUDY

MATHEMATICS

GRADE TWO

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Numbers and Numeration

GRADE TWO

The Child Will:

1. Identify the number of objects in sets of 0-20 objects
2. Use symbols and/or words to identify 0 through 20 objects
3. Give and write the numbers 0 through 100 in order
4. Use the word names for ordinal numbers first through tenth
5. Identify names for a given number
6. Compare numbers in terms of greater than (>) and less than (<)
7. Use ordinal numbers to indicate location
8. Put a sequence of numbers in order from least to greatest or vice versa
9. Give the standard numeral for a given number of hundreds and vice versa
10. Identify the numbers of hundreds, tens, and ones for any number less than 1000
11. Write the standard numeral for a given number of hundreds, tens, and ones
12. Identify numerals that have a given number in the hundreds, tens, or ones place
13. Identify the number that is 10 greater than or 10 less than a given number
14. Write a standard numeral for a number of hundreds, tens, and ones given in expanded form
15. Count by ones, twos, threes, fives, and tens to complete tables
16. Count by twos, fives, or tens to find a total
17. Give the order of hundreds to complete a sequence
18. Identify the hundred that is greater or less than a given hundred

Numbers and Numeration

GRADE TWO

19. Give the order of numbers through 999

20. Identify pairs of objects as odd or even

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COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Addition

GRADE TWO

The Child Will:

1. Associate addition with a given pictured situation
2. Recognize addition situations
3. Complete exercises involving sums through 18
4. Use a number track and rods to complete exercises involving sums through 18
5. Complete basic fact exercises through 18 in vertical form
6. Identify families of facts through 18
7. Use basic facts to decode a message
8. Write the four sentences that belong to a family of facts through 18
9. Regroup to make another 10 when there are more than 9 single objects
10. Write two numbers in vertical form and find the sum (a number less than 10 and a number between 10 and 100)
11. Add two numbers whose sum is less than 100
12. Find the sum of 3 or more numbers given in standard form with sums less than 100
13. Add two digit numbers given in standard form without regrouping
14. Add three digit numbers given in standard form without regrouping
15. Add two digit numbers given in standard form with one renaming
16. Add three digit numbers given in standard form with one renaming
17. Use addition to decode a message and to complete a puzzle
18. Match names for the same number
19. Compare numbers when one of the numbers is in the form 5+9 or 16-8

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Subtraction

GRADE TWO

The Child Will:

1. Associate subtraction with a given pictured situation
2. Recognize subtraction situations
3. Complete exercises involving minuends through 18
4. Use a number track and rods to complete exercises involving minuends through 18
5. Complete basic fact exercises through 18 in vertical form
6. Identify families of facts through 18
7. Use basic facts to decode a message
8. Write the four sentences that belong to a family of facts through 18
9. Match names for the same number
10. Rename numbers so that there are more than 9 ones
11. Subtract a number less than 10 from a number between 10 and 100, expanded form
12. Find the difference of two numbers less than 100, expanded form
13. Subtract 2 digit numbers when exercises are written in the traditional form with no renaming
14. Subtact 3 digit numbers when written in traditional form with no renaming
15. Subtract 2 digit numbers when written in the traditional form with one renaming
16. Subtract 3 digit numbers when written in traditional form with one renaming
17. Use subtraction to decode a message and to complete a puzzle
18. Compare numbers when one of the numbers is in the form 5+9 or 16-8

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Multiplication

GRADE TWO

The Child Will:

1. Find the sum of two or more numbers when all the numbers are the same
2. Give a multiplication fact for a repeated addition sequence
3. Give products of basic facts through 18
4. Complete number sentences involving products through 18
5. Complete exercises written in vertical form

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Fractions

GRADE TWO

The Child Will:

1. Identify the number of equal parts in a whole object
2. Identify which of two objects is separated into equal parts
3. Identify 1/2, 1/3, 2/3, 1/4, 2/4, or 3/4 of an object

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Ratios and Proportions

GRADE TWO

The Child Will:

Complete the tables that involve counting by ones, twos, threes, fives, and tens

40

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Graphing

GRADE TWO

The Child Will:

1. Interpret information given in a bar graph
2. Record data and make a bar graph
3. Use ordered pairs to locate positions on a grid
4. Give ordered pairs located on a grid
5. Count by ones, twos, fives, or tens to interpret a pictograph

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Geometry

GRADE TWO

The Child Will:

1. Identify and draw closed figures
2. Identify objects that have the same shape
3. Identify triangles, squares, circles, and rectangles
4. Identify sides and corners of polygons
5. Draw a figure with a given number of sides or corners
6. Identify a line of symmetry for a given figure
7. Draw a line of symmetry for a given figure
8. Complete a figure so that a given line is a line of symmetry

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Measurement

GRADE TWO

The Child Will:

1. Use a standard unit of measure to measure objects and compare their lengths
2. Measure and indicate lengths with an inch ruler
3. Measure and indicate lengths with a centimeter ruler
4. Measure lengths to the nearest inch
5. Measure lengths to the nearest centimeter
6. Measure the sides of closed figures in inches and centimeters
7. Find the perimeter of a polygon by counting or by measuring
8. Identify which of two groups of containers holds more or less
9. Identify how many pints or quarts can be filled by a given number of pints and quarts
10. Decide if a container holds less than a liter
11. Count the number of square units inside a polygon

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Problem Solving

GRADE TWO

The Child Will:

1. Identify the operation associated with a pictured situation
2. Write addition and subtraction equations for pictured situations
3. Write a number sentence to solve a problem and give the answer to the problem
4. Write number sentences for rebus problems
5. Write answers involving comparison situations: How many more or how many in all?
6. Write answers involving comparison situations: How many less or how many left?
7. Find the shortest path from one point to another point on a grid

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Applications .

GRADE TWO

The Child Will:

1. Tell time to the hour, half hour, and quarter hour
2. Read, construct, and interpret a monthly calendar
3. Determine the value of a group of coins and the number of pennies, nickels, dimes, and quarters needed to make a given amount
4. Tell the amount of money when given a collection of coins and a dollar bill
5. Count and compare amounts of money in buying situations

GRADED COURSE OF STUDY

MATHEMATICS

GRADE THREE

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Numbers and Numeration

GRADE THREE

The Child Will:

1. Give place value through millions
2. Read and write standard numerals through 9999
3. Give the place value for any digit in a numeral through 9999
4. Count and order numbers less than 10,000 by thousands, hundreds, tens, or ones
5. Write expanded numerals from standard numerals through 9999 and vice versa
6. Read and write numerals through 999,999
7. Identify the millions place
8. Name the numbers between two given numbers
9. Count and order numbers less than 10,000 by thousands, hundreds, tens, or ones
10. Use counting in extending a number sequence, by 3's and by 4's
11. Compare two numbers using less than (<) or greater than (>)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Addition

GRADE THREE

The Child Will:

1. Recall addition basic facts for sums through 18
2. Find missing addends for basic facts
3. Give different names for numbers, using addition basic facts
4. Add three or more numbers, using basic facts
5. Find sums for basic facts, using the number line
6. Write number sentences for addition problems
7. Rename numbers less than 100 to find standard numerals
8. Rename numbers less than 1000 to find standard numerals
9. Add two numbers less than 100 without renaming
10. Add two numbers less than 1000 to find standard numerals
11. Add two numbers less than 100 with one renaming
12. Add two numbers less than 1000 renaming tens as hundreds
13. Add two numbers less than 1000 renaming ones as tens
14. Add three numbers less than 10
15. Solve addition problems with numbers less than 100
16. Solve addition problems with numbers less than 1000
17. Add two numbers less than 10,000 without renaming
18. Add two numbers less than 10,000 with one renaming
19. Add two numbers less than 10,000 with two renamings
20. Add three numbers less than 1000

Addition

GRADE THREE

21. Solve problems involving addition

22. Check addition by changing the order in which you add

23. Add two or three numbers, with up to four digits, with one renaming

24. Add two or three numbers, with up to four digits, with two renamings

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Subtraction

GRADE THREE

The Child Will:

1. Recall subtraction basic facts for minuends through 18
2. Give different names for numbers using subtraction basic facts
3. Find differences of the basic facts by using the number line
4. Write number sentences for subtraction problems
5. Write number sentences for comparative subtraction problems
6. Rename a number less than 100 to show more ones
7. Rename numbers less than 1000 to show more tens or ones
8. Subtract two numbers less than 100 without renaming
9. Subtract two numbers less than 1000 without renaming
10. Subtact two numbers less than 100 with one renaming
11. Subtract two numbers less than 1000, renaming hundreds as tens or tens as ones
12. Solve subtraction word problems with numbers less than 1000
13. Use subtraction to find answers to word problems involving too much information
14. Subtract two numbers less than 10,000 without renaming
15. Subtract two numbers less than 10,000 with one renaming
16. Subtract two numbers less than 10,000 with two renamings
17. Subtract two numbers less than 1000 involving renamings with zeros
18. Check subtraction by adding

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Multiplication

GRADE THREE

The Child Will:

1. Learn multiplication basic facts for products through 81
2. Give products for basic facts stated in computational form
3. Complete pairs of related multiplication and division sentences
4. Write the four related sentences for multiplication and division when three appropriate numbers are given
5. Find products for the basic facts by using the number line
6. Write a number sentence for a multiplication problem and give the answer to the problem
7. Find missing factors for basic facts
8. Multiply three numbers, using basic facts
9. Solve word problems involving multiplication basic facts
10. Multiply 10 or 100 by a number less than 100
11. Multiply a multiple of 10 or 100 by a number less than 10
12. Multiply a number less than 100 by a number less than 10
13. Multiply a number less than 1000 by a number less than 10
14. Solve word problems involving multiplication
15. Complete both an addition and a multiplication sentence for a given situation
16. Use the order property of multiplication to find products
17. Complete two multiplication sentences for an array
18. Write a multiplication sentence associated with lines crossing one another

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Division

GRADE THREE

The Child Will:

1. Learn division basic facts for dividends through 81
2. Give quotients for basic facts stated in computational form
3. Complete pairs of related multiplication and division sentences
4. Write the four related sentences for multiplication and division when three appropriate numbers are given
5. Find quotients for basic facts by using the number line
6. Write a number sentence for a division problem and give the answer to the problem
7. Give quotients for division basic facts using 2, 3, 4, 5, 6, or 7 as the divisor or as the quotient
8. Give quotients for division basic facts using 2, 3, 4, 5, 6, 7, 8, or 9 as the divisor or as the quotient
9. Use addition, subtraction, multiplication, or division to find answers to word problems
10. Give the quotient when the dividend is zero
11. Solve problems involving division basic facts
12. Solve problems involving division basic facts and identify the quotient and a remainder
13. Divide a number less than 1000 by a number less than 100, obtaining a quotient less than 5
14. Divide a number less than 100 by a number less than 10, obtaining a quotient less than 10
15. Divide a number less than 1000 by a number less than 10, obtaining a quotient less than 100

Division

GRADE THREE

16. Solve problems involving division with remainders

17. Find quotients and write division sentences for arrays

18. Find a quotient by repeated subtraction

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Fractions

GRADE THREE

The Child Will:

1. Identify the number of equivalent parts in a region
2. Choose the correct fraction for part of a region
3. Write a fraction for part of a region
4. Write fractions equal to 1
5. Write a fraction for part of a set
6. Use fractions to name points on the number line from 0 to 1
7. Compare fractions by using pictures

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Graphing

GRADE THREE

The Child Will:

1. Recall use of simple bar graphs
2. Read and interpret simple bar graphs
3. Give an ordered pair of numbers for a point on a grid
4. Graph and connect points on a grid to form geometric figures
5. Be able to read and interpret a pictograph

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Geometry

GRADE THREE

The Child Will:

1. Find congruent figures
2. Identify congruent line segments
3. Identify diagonals of geometric fugures
4. Identify an angle
5. Identify a right angle
6. Identify similar objects
7. Count the sides and corners in a geometric figure and name the figure
8. Identify symmetric figures
9. Identify a line of symmetry for a given figure and complete a figure when given a line of symmetry
10. Identify congruent line segments and figures
11. Find the number of sides and corners in a geometric figure
12. Identify pentagons and octagons
13. Identify a cube

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Measurement

GRADE THREE

The Child Will:

1. Identify body units
2. Use the meter in linear measurement
3. Use the liter in capacity measurement
4. Measure length to the nearest half inch
5. Use the English units of foot and yard in linear measurement
6. Use the English unit gallon in capacity measurement
7. Tell time to five minutes
8. Tell time using "quarter to" and "quarter past"
9. Solve problems involving time
10. Find area by counting square units
11. Find area by counting square centimeters
12. Find volume by counting cubic units
13. Use estimation to find a sensible answer for a word problem
14. Give equivalent liquid measures
15. Measure the perimeter of geometric figures to the nearest centimeter
16. Measure the radius of a circle to the nearest centimeter
17. Measure the diameter of a circle

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Problem Solving

GRADE THREE

The Child Will:

1. Solve addition problems with numbers less than 100
2. Write division equations for picture situations
3. Use tables and patterns
4. Use drawing diagrams
5. Write division equations for picture situations
6. Solve subtraction problems with numbers less than 1000
7. Solve problems involving addition and subtraction of amounts of money
8. Solve problems involving multiplication and division basic facts
9. Solve problems involving division with renaming
10. Solve problems involving multiplication

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Applications

GRADE THREE

The Child Will:

1. Count a collection of dollars, dimes, and pennies, and record the amount using the dollar sign and cents point
2. Count a collection of half dollars, quarters, and nickels, and record the amount using the dollar sign and the cents point
3. Tell time to the hour
4. Tell time to the half-hour
5. Tell time to five minutes
6. Solve problems in addition related to the content areas
7. Relate mathematics to solving problems in transportation
8. Relate mathematics to solving problems in sports and leisure time activities
9. Apply mathematics in dealing with magic squares, and figurative numbers
10. Read a calendar

GRADED COURSE OF STUDY

MATHEMATICS

GRADE FOUR

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Numbers and Numeration

GRADE FOUR

The Child Will:

1. Give place value through hundred millions
2. Round a number to the nearest ten and hundred
3. Use Roman numerals less than 50
4. Identify prime numbers through twenty-three
5. Identify square numbers through forty-nine
6. Write standard numerals through 999,999
7. Write an expanded numeral for a standard numeral and a standard numeral for an expanded numeral
8. Write standard numerals through millions
9. Compare numbers less than 10,000
10. Order a set of numbers
11. Order numbers through thousands
12. Order numbers by hundreds, tens, or ones
13. Use a number line to order numbers
14. Use even and odd numbers
15. Compare numbers less than 100 using less than (<) and greater than (>)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Addition

GRADE FOUR

The Child Will:

1. Recall addition facts
2. Find missing addends for basic facts
3. Write related sentences for addition basic facts
4. Add two numbers less than 1000 with nonconsecutive renamings
5. Add three or more numbers less than 1000 with nonconsecutive renamings
6. Add two or more numbers less than 10,000 with consecutive renamings
7. Solve problems involving addition
8. Complete function tables using addition
9. Add two numbers in a place-value chart and rename the sum
10. Use mental computation in addition problems
11. Write an equation and solve a problem solving a missing addend

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Subtraction

GRADE FOUR

The Child Will:

1. Recall subtraction facts
2. Find a missing addend for a basic fact
3. Write related sentences for subtraction basic facts
4. Subtract numbers with one renaming
5. Subtract numbers with two or more renamings
6. Subtract numbers with renaming involving zeros
7. Solve word problems involving subtraction
8. Solve problems involving a missing addend
9. Use subtraction in mental computation
10. Use function tables for subtraction

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Multiplication

GRADE FOUR

The Child Will:

1. Recall multiplication basic facts
2. Find missing factors in basic fact sentences
3. Write related sentences for multiplication basic facts
4. Find multiples of a number
5. Multiply two numbers with one or both numbers multiples of 1000 or 10,000
6. Multiply a one-digit and a two-digit factor showing partial products
7. Multiply a one-digit and a three-digit factor showing partial products
8. Estimate a product by rounding
9. Multiply a number and a multiple of 10 or 100
10. Multiply two, two-digit factors
11. Multiply a two-digit factor and a three-digit factor
12. Estimate a product
13. Find the total number of choices for a problem situation
14. Solve word problems involving multiplication
15. Relate multiplication to addition
16. Multiply three or more numbers each less than 10
17. Do multiplication problems involving the use of 1 and 0 in finding the products
18. Use multiplication in mental computation

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Division

GRADE FOUR

The Child Will:

1. Recall division basic facts through 81
2. Find missing factors in basic fact sentences
3. Divide (using only basic facts) and identify quotient and remainder
4. Write related sentences for multiplication
5. Divide by a one-digit divisor
6. Divide by a two-digit divisor
7. Multiply to check division
8. Do problems in division related to multiplication by using a multiplication basic fact to find a quotient
9. Solve problems involving division
10. Solve problems that involve interpreting the remainder
11. Find averages
12. Partition sets to find quotients for basic facts with dividends through 36
13. Find a quotient using ones as partial quotient
14. Do a division problem with 1 and 0 in the problem
15. Do problems in division relating to subtraction by removing groups one at a time
16. Divide by a two-digit divisor, using multiples of 10 as partial quotients
17. Partition a set to find the number of equal groups and the number left over
18. Solve problems that involve interpreting the remainder

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Fractions

GRADE FOUR

The Child Will:

1. Compare fractions to tell if a fraction is greater than 1, less than 1, or equal to 1
2. Compare fractions with like denominators, using a picture or number line
3. Compare fractions with like denominators
4. Compare fractions with unlike denominators, using a number line
5. Fold paper to find equal fractions
6. Give equal fractions for a pictorial situation
7. Write equal fractions using a number line
8. Multiply to find equal fractions
9. Use a mixed number to give the length of an object
10. Write a mixed number for a pictorial situation
11. Write an improper fraction and a mixed number for a pictorial situation
12. Write an improper fraction and a mixed number for a point on the number line

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Decimals

GRADE FOUR

The Child Will:

1. Read and write decimals involving tenths
2. Read and write decimals involving hundredths
3. Give the place value for any digit in a decimal involving tenths or hundredths
4. Use a decimal to write an amount of money
5. Add two or more decimals involving tenths
6. Subtract decimals involving tenths
7. Add or subtract amounts of money shown as decimals

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Ratios and Proportions

GRADE FOUR

The Child Will:

1. Tell how an equal ratio can be obtained from a given ratio
2. Find ratios equal to a given ratio
3. Count objects or use a pattern to complete a table of ratios
4. Use multiplication to complete a table of ratios
5. Solve a problem by making a table of ratios
6. Solve word problems by making a ratio table
7. Solve problems using equal ratios
8. Find equivalent measures by using equal ratios

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Graphing

GRADE FOUR

The Child Will:

1. Give an ordered pair of numbers for a point on a grid
2. Locate the point on a grid for an ordered pair of numbers
3. Locate points of a line on a grid and draw the line
4. Construct a table of number pairs from a graph and write the rule
5. Write a rule for a graph
6. Locate points on a grid and draw simple polygons
7. Interpret a bar graph
8. Make a bar graph
9. Use a rule to construct a table of number pairs and make a graph for the rule

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Geometry

GRADE FOUR

The Child Will:

1. Tell whether a figure is a polygon
2. Identify triangles, quadrilaterals, pentagons, and hexagons
3. Find the number of angles and number of sides of a polygon
4. Identify parallelograms
5. Connect two points to show a segment
6. Distinguish between a segment and a line
7. Identify a pair of lines as parallel or intersecting
8. Make constructions with a compass
9. Graph function rules
10. Find function rules

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Measurement

GRADE FOUR

The Child Will:

1. Choose an appropriate metric unit of length, the kilometer
2. Change kilometers to meters
3. Choose an appropriate metric unit of weight, the kilogram
4. Change kilograms to grams
5. Use the English unit, fourth of an inch in linear measurement
6. Use the English unit of linear measurement, the mile
7. Use the English units of weight, ounce, pound, and ton
8. Tell whether a given temperature is Fahrenheit or Celsius
9. Multiply to find the perimeter of a regular polygon

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Problem Solving

GRADE FOUR

The Child Will:

1. Write equations involving missing addends
2. Use ratios to solve problems
3. Find averages
4. Solve problems involving multiplication and division
5. Solve problems that involve interpreting the remainder
6. Solve problems involving addition and subtraction
7. Solve problems involving a missing addend
8. Solve problems involving division
9. Solve problems that involve interpreting the remainder

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Applications

GRADE FOUR

The Child Will:

1. Record data and draw conclusions
2. Find averages
3. Make scale drawings
4. Relate mathematics to the content areas
5. Relate mathematics to career education
6. Apply mathematics to number tricks
7. Add and subtract amounts of money
8. Find products involving money

GRADED COURSE OF STUDY

MATHEMATICS

GRADE FIVE

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Numbers and Numeration

GRADE FIVE

The Child Will:

1. Give place value for any digit in a numeral through millions
2. Read and write numerals through hundred millions
3. Order and compare whole numbers through hundred millions
4. Find expanded numerals for standard numerals
5. Find standard numerals for expanded numerals
6. Use greater than (>), less than (<), and equal (=) to compare two numbers
7. Round whole numbers to nearest ten and nearest hundred
8. Read Roman numerals
9. Tell whether a number is even or odd
10. Name some multiples of a number
11. Name common multiples of two numbers
12. Find least common multiple of two numbers

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Addition

GRADE FIVE

The Child Will:

1. Recall addition basic facts
2. Add two or more whole numbers with up to five digits with renaming
3. Estimate the sum of two or more whole numbers by using rounded numbers
4. Solve problems for missing addend
5. Solve word problems
6. Recognize examples of order (commutative) and grouping (associative) properties of addition

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Subtraction

GRADE FIVE

The Child Will:

1. Recall subtraction basic facts
2. Subtract numbers with up to five digits with renaming
3. Estimate differences by using rounded numbers
4. Solve missing addend equations
5. Solve word problems
6. Check subtraction by addition

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Multiplication

GRADE FIVE

The Child Will:

1. Recall multiplication facts through products of 81
2. Multiply a whole number by 10, 100, and 1000
3. Multiply two numbers that are multiples of 10, 100, or 1000
4. Multiply by a one-digit factor
5. Multiply by a two-digit factor
6. Multiply by a three-digit factor
7. Estimate the product of two whole numbers by rounding
8. Multiply whole numbers by using the order (commutative) and grouping (associative) properties of multiplication
9. Solve multiplication equation with a missing factor
10. Multiply three one-digit numbers
11. Solve word problems

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Division

GRADE FIVE

The Child Will:

1. Recall division basic facts with dividends through 81
2. Divide with a one-digit divisor and a two-digit dividend with or without a remainder
3. Divide with a one-digit divisor and a three digit dividend with or without a remainder
4. Divide with a one-digit divisor to get a three digit quotient with or without a remainder
5. Divide with a two-digit divisor to get a one-digit quotient with or without a remainder
6. Divide with a two-digit divisor to get a two-digit quotient with or without a remainder
7. Solve missing factor equations
8. Solve word problems and interpret remainders
9. Find averages
10. Check division by using multiplication and addition
11. Express quotients as mixed numbers

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Fractions

GRADE FIVE

The Child Will:

1. Write a fraction or mixed number for a picture of a region, a set, a ruler, or a scale
2. Write equal fractions for pictures of regions, rulers, scales, and number lines
3. Find a fraction equal to a given fraction
4. Write a mixed number for objects, points on a number line, and measurements
5. Reduce fractions to lowest terms
6. Find common denominator for two fractions
7. Compare and order fractions and mixed numbers with different denominators
8. Find a missing numerator or denominator in equal fractions
9. Give an improper fraction for a mixed number or a mixed number for an improper fraction
10. Divide whole numbers and write quotient as a mixed number
11. Add two or more fractions or mixed numbers with the same denominator with or without renaming the sum
12. Add two or more fractions or mixed numbers with different denominators with or without renaming the sum
13. Subtract fractions or mixed numbers with the same denominators without renaming
14. Subtract a fraction or a mixed number from a whole number
15. Subtract mixed numbers with the same or different denominators with renaming
16. Multiply two fractions

Fractions

GRADE FIVE

17. Multiply a fraction and a whole number

18. Multiply mixed numbers

19. Solve word problems involving fractions

81

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Decimals

GRADE FIVE

The Child Will:

1. Give place value for any digit in a decimal numeral through 1000
2. Write decimals through 1000
3. Write decimals in order on a number line or in a list
4. Compare decimals
5. Write a decimal equal to a given fraction
6. Add two or more decimals through 1000 with renaming
7. Subtract decimals through 1000 with renaming
8. Find missing addends
9. Count decimal places through 100,000
10. Multiply a decimal by a whole number
11. Multiply decimals by 10, 100, and 1000
12. Multiply decimals using fractions
13. Multiply decimals
14. Multiply decimals with zeros in the product
15. Solve word problems involving decimals

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Ratios and Proportions

GRADE FIVE

The Child Will:

1. Write a ratio for a rate situation
2. Find equal ratios for rate situations
3. Find missing numbers in equal ratios
4. Decide if two ratios are equal by using cross-products
5. Solve word problems involving equal ratios

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Graphing

GRADE FIVE

The Child Will:

1. Read, interpret, and make a bar or pictograph
2. Locate points for ordered pairs, and give ordered pairs for points
3. Read and interpret a line graph
4. Complete a table and make a line graph
5. Solve word problems using graphs

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Geometry

GRADE FIVE

The Child Will:

1. Identify triangles, quadrilaterals, pentagons, hexagons, octagons, rectangles, and squares
2. Identify points, lines, segments, rays, intersecting lines, parallel lines, and perpendicular lines
3. Name and classify angles as right, acute, or obtuse
4. Identify faces, vertices, and edges of a three-dimensional geometric figure
5. Draw congruent angles and perpendicular lines using a protractor
6. Tell whether two figures are congruent
7. Tell whether two figures are similar
8. Solve word problems involving geometry

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Measurement

GRADE FIVE

The Child Will:

1. Choose an appropriate metric or English measure of length, capacity, or mass (weight)
2. Find an equal measure using a smaller or larger metric unit when given a metric measure of length, capacity, or mass
3. Estimate length, capacity, and mass (weight) using both the metric and English system
4. Read a thermometer and choose an appropriate temperature in degrees Celsius or Fahrenheit
5. Find the perimeter of a figure
6. Find area by counting units
7. Find the area of a rectangle or triangle by multiplying
8. Measure an angle using a protractor
9. Find the volume of a rectangular prism by counting cubes
10. Find the volume by multiplying
11. Solve word problems

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Problem Solving

GRADE FIVE

The Child Will:

1. Solve word problems involving addition, subtraction, multiplication, and division of whole numbers, decimals, and fractions
2. Write equations involving missing addends and factors
3. Use formulas to find area and volume
4. Solve problems involving equal ratios
5. Solve problems using tables, patterns, and diagrams
6. Find averages

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Applications

GRADE FIVE

The Child Will:

1. Read and make bar and line graphs
2. Read and intrepret maps and scale drawings
3. Use logical reasoning to solve problems
4. Use number patterns to solve problems
5. Record data and draw conclusions
6. Find averages
7. Predict the probability of an event
8. Apply math knowledge to solve problems dealing with other subjects
9. Solve problems dealing with money
10. Relate math to sports and leisure time activities
11. Learn to solve puzzles, codes, magic squares, and number tricks
12. Apply math to games and clock arithmetic

GRADED COURSE OF STUDY

MATHEMATICS

GRADE SIX

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Numbers and Numeration

GRADE SIX

The Child Will:

1. Give place value of any digit in a numeral through billions
2. Read and write numerals through hundred billions
3. Order and compare whole numbers through hundred billion
4. Find expanded numerals for standard numerals
5. Find standard numerals for expanded numerals
6. Use greater than (>), less than (<), and equal (=) to compare two numbers
7. Round whole numbers to nearest ten, nearest hundred, and nearest thousand
8. Read Roman numerals
9. Tell whether a number is even or odd
10. Tell whether a number is prime or composite
11. Name some multiplies of a number
12. Name common multiplies of two numbers
13. Find least common multiple of two numbers
14. Name the factors of a number
15. Name the prime factors of a number using a factor tree
16. Read and use exponents
17. Write positive and negative numbers for given situations
18. Order and compare integers
19. Add integers
20. Subtract integers

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Addition

GRADE SIX

The Child Will:

1. Recall addition basic facts
2. Add two or more whole numbers with up to six digits with renaming
3. Estimate the sum of two or more whole numbers by using rounded numbers
4. Solve problems for missing addends
5. Solve word problems
6. Add whole numbers using the commutative and associative properties of addition
7. Learn the check for addition problems

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Subtraction

GRADE SIX

The Child Will:

1. Recall subtraction basic facts
2. Subtract numbers with up to six digits with renaming
3. Estimate differences using rounded numbers
4. Solve missing addend equations
5. Solve word problems
6. Check subtraction by addition

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Multiplication

GRADE SIX

The Child Will:

1. Recall multiplication facts through products of 81
2. Multiply a whole number by 10, 100, and 1000
3. Multiply two numbers that are multiples of 10, 100, or 1000
4. Multiply by a one-digit factor
5. Multiply by a two-digit factor
6. Multiply by a three-digit factor
7. Estimate the product of two whole numbers by rounding
8. Multiply whole numbers by using the commutative and associative properties of multiplication
9. Solve multiplication equation with a missing factor
10. Multiply an amount of money by a whole number
11. Multiply three numbers
12. Check for multiplication by reversing factors
13. Solve word problems

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Division

GRADE SIX

The Child Will:

1. Recall division basic facts with dividends through 81
2. Divide with one-digit divisor to get a one, two, three, or four digit quotient with or without remainders
3. Divide with two-digit divisor to get a one, two, three, or four digit quotient with or without a remainder
4. Divide with three-digit divisors with or without a remainder
5. Divide with zeros in the quotient with or without a remainder
6. Solve missing factor equations
7. Solve word problems and interpret remainders
8. Find averages
9. Check division by using multiplication and addition
10. Express quotients as mixed numbers

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Fractions

GRADE SIX

The Child Will:

1. Write a fraction for part of a region or part of a set
2. Find a fraction equal to a given fraction
3. Reduce a fraction to lowest terms
4. Write an improper fraction for a mixed number or a mixed number for an improper fraction
5. Divide whole numbers and write the quotient as a mixed number
6. Compare and order fractions and mixed numbers
7. Find common denominators for two or more fractions
8. Add two or more fractions or mixed numbers with the same denominators with or without renaming the sum
9. Add two or more fractions or mixed numbers with different denominators with or without renaming the sum
10. Subtract fractions or mixed numbers with the same denominators without renaming
11. Subtract a fraction or a mixed number from a whole number
12. Subtract mixed numbers with the same or different denominators with renaming
13. Multiply two or more fractions
14. Multiply a fraction and a whole number
15. Multiply two or more mixed numbers
16. Find cross-products for fractions
17. Find reciprocals
18. Divide fractions and mixed numbers
19. Solve word problems involving the four operations and fractions

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Decimals

GRADE SIX

The Child Will:

1. Give the place value of any digit in a decimal numeral through millionth
2. Write decimals through millionths
3. Compare and order decimals
4. Write a decimal equal to a given fraction or write a fraction equal to a given decimal
5. Round decimals to nearest one, tenth, hundredth, or thousandth
6. Estimate sums or differences using rounded numbers
7. Add and subtract decimals through thousandths with renaming
8. Find missing addends
9. Count decimal places through millionths
10. Multiply decimals
11. Multiply decimals by 10, 100, and 1000
12. Divide decimals by a whole number
13. Divide by a decimal
14. Divide a decimal by 10, 100, and 1000

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Ratios and Proportions

GRADE SIX

The Child Will:

1. Find equal ratios for rate situations
2. Find missing numbers for equal ratios
3. Decide if two ratios are equal by using cross products
4. Solve word problems involving equal ratios

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Percent

GRADE SIX

The Child Will:

1. Write a percent for a fraction
2. Find a percent of a number
3. Find a number given a percent of that number
4. Solve problems involving percents

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Graphing

GRADE SIX

The Child Will:

1. Read, interpret, and make a pictograph or bar graph
2. Read, interpret, and make a line graph
3. Read and interpret a broken-line graph
4. Read and interpret a circle graph
5. Give an ordered pair for a point on a grid, and locate a point on a grid for an ordered pair
6. Solve word problems using tables and graphs

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Geometry

GRADE SIX

The Child Will:

1. Identify polygons
2. Identify points, line segments, rays, lines, or angles by appropriate symbols and letters
3. Name and classify angles as a right, an acute, an obtuse, or a central angle
4. Identify polyhedrons and their faces, vertices, and edges
5. Identify flat and curved surfaces of a three-dimensional geometric figure
6. Identify and find the radius, diameter, and circumference of a circle
7. Identify cylinders and spheres
8. Tell whether or not two shapes are similar or congruent
9. Solve word problems involving geometry

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Measurement

GRADE SIX

The Child Will:

1. Choose an appropriate metric or English measure of length, capacity, or mass (weight)
2. Find an equal measure using a smaller or larger metric unit when given a metric measure of length, capacity, or mass
3. Estimate length, capacity, and mass (weight) in both the metric and English systems
4. Read a thermometer and choose an appropriate temperature in degrees Celsius or Fahrenheit
5. Find the perimeter of a figure
6. Find the area of a rectangle or triangle
7. Find the surface area of a polyhedron
8. Find the volume of a rectangular prism
9. Measure and draw angles with a protractor
10. Solve word problems

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Problem Solving

GRADE SIX

The Child Will:

1. Solve word problems involving addition, subtraction, multiplication, and division of whole numbers, decimals, and fractions
2. Write equations involving missing addends and factors
3. Use formulas to find area, volume, and circumference
4. Solve problems involving equal ratios
5. Solve problems using tables, patterns, diagrams, and graphs
6. Find averages
7. Use percent to solve problems

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Applications

GRADE SIX

The Child Will:

1. Read and make bar, line, and circle graphs
2. Interpret and make maps and scale drawings
3. Use logical reasoning to solve problems
4. Use number patterns to solve problems
5. Record data and draw conclusions
6. Find averages
7. Write fractions for experiments
8. Predict the probability of an event
9. Use a tree diagram to solve problems
10. Apply math knowledge to solve problems dealing with other subject areas
11. Relate math to careers
12. Solve problems related to earning, spending, and comparative shopping
13. Relate math to sports and leisure time activities
14. Apply math to puzzles, codes, magic squares, number tricks, and games

GRADED COURSE OF STUDY

MATHEMATICS

SCOPE AND SEQUENCE

MATHEMATICS

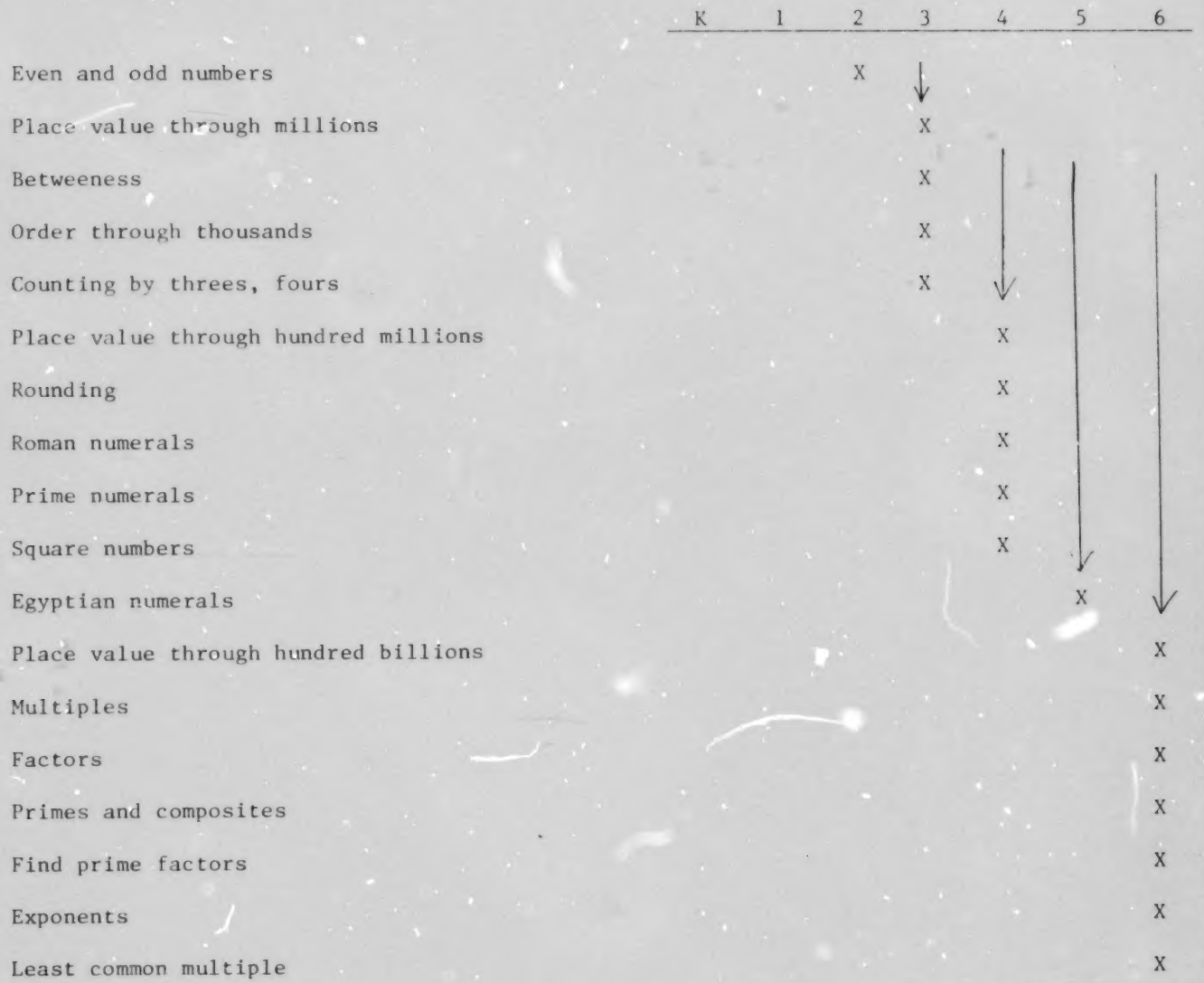
Numbers and Numeration

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Sorting and classifying objects	X						
The numbers zero through five	X						
Comparison ideas: as many as, more than, fewer than, one more than	X						
Ordering sets	X						
Counting by ones	X						
Ordinal numbers: first through fifth	X						
The numbers six through ten	X						
Grouping and recording tens		X					
The decade numbers		X					
The teen numbers		X					
Place value to one hundred		X					
Order to one hundred		X					
Comparison ideas: greater than, less than		X					
Ordered pairs: locate positions on a grid		X					
Number line		X					
Counting ones, tens, fives, twos		X					
Ordinal numbers first through tenth			X				
Place value to one thousand			X				
Expanded notation			X				
Ten greater, ten less			X				
Meaning of hundreds			X				
Renaming proportions for addition and subtraction			X				

Numbers and Numeration

SCOPE AND SEQUENCE



MATHEMATICS

Addition

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Joining sets	X	↓	↓	↓	↓	↓	
Meaning of addition		X	↓	↓	↓	↓	
Sums through twelve		X	↓	↓	↓	↓	
Zero as an addend		X	↓	↓	↓	↓	
Three addends with sums of twelve or less		X	↓	↓	↓	↓	
Families of facts		X	↓	↓	↓	↓	
Names for numbers		X	↓	↓	↓	↓	
Order property in addition		X	↓	↓	↓	↓	
Grouping property in addition		X	↓	↓	↓	↓	
Missing addend		X	↓	↓	↓	↓	
Sums through 18			X	↓	↓	↓	
Use of a number track			X	↓	↓	↓	
Three addends with sums of 18 or less			X	↓	↓	↓	
Adding with one renaming			X	↓	↓	↓	
Adding two-digit numbers			X	↓	↓	↓	
Adding three-digit numbers			X	↓	↓	↓	
Use of a number line				X	↓	↓	
Adding three or more numbers				X	↓	↓	
Adding with two renamings				X	↓	↓	
Mental computation				X	↓	↓	
Adding with three or more renaming					X	↓	
Estimating sums						X	

MATHEMATICS

Subtraction

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Meaning of		X	↓	↓	↓		
Minuends of two through twelve		X					
Zero as a subtrahend or a difference		X					
Families of facts		X					
Names for numbers		X	↓				
Minuends through 18			X				
Use of number track			X				
Preparation for renaming			X				
Subtracting with one renaming			X				
Subtracting two-digit numbers			X				
Subtracting three-digit numbers			X	↓			
Use of a number line				X			
Subtracting with two renamings				X			
Checking by adding				X	↓		
Subtracting with more than two renamings					X		
Related to addition					X		
Mental computation					X		
Estimating						X	

MATHEMATICS

Multiplication

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Meaning of			X	↓	↓	↓	
Related to addition			X				
Products through 18			X				
Order in			X				
Equivalent sets				X			
Arrays				X			
Number line				X			
Products through 81				X			
Grouping				X			
One and zero				X			
Missing factor				X			
More than two factors				X			
Multiples of 10 and 100 as factors				X			
One-digit multipliers				X	↓		
Multiples					X		
Multiples of 10, 100, and 1000 as factors					X		
Two-digit multipliers					X		
Estimating products					X		
Mental computation					X	↓	
Least common multiples						X	
Three-digit multipliers						X	
Missing factors in computation						X	

MATHEMATICS

Division

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Meaning of				X	↓	↓	↓
Equivalent sets				X			
Arrays				X			
Number line				X			
Dividends through 81				X			
Related to subtraction				X			
Related to multiplication				X			
One and zero				X			
One-digit divisors, one-digit quotients				X			
One-digit divisors, two-digit quotients				X			
Two-digit divisors, one-digit quotients				X			
Remainders				X	↓		
Two-digit divisors, two-digit quotients					X		
Checking division					X	↓	
One-digit divisors, three-digit quotients						X	
Expressing quotients as mixed numbers						X	↓
Three-digit divisors							X
Zeros in the quotient							X

MATHEMATICS

Fractions

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Idea of halves, thirds, fourths	X						
Equal parts		X					
Regions 1/2, 1/3, 1/4		X	↓				
Regions 2/3, 2/4, 3/4			X				
Sets 1/2, 1/3, 2/3, 1/4, 2/4, 3/4			X	↓			
Meaning of				X			
Writing fractions using regions, sets, number line and ruler				X			
Equals to one				X			
Comparing fractions by using pictures				X	↓		
Comparing fractions					X		
Finding equal fractions using pictures and multiplication					X		
Writing mixed numbers					X		
Writing improper fractions					X		
Adding fractions with same denominator					X		
Subtracting fractions with same denominator					X	↓	
Ordering fractions						X	
Finding equal fractions using division						X	
Finding equal fractions in lowest terms						X	
Comparing mixed numbers						X	
Changing improper fractions to mixed numbers						X	
Changing mixed numbers to improper fractions						X	
Adding fractions with different denominators						X	

Fractions

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Adding three fractions						X	
Adding mixed numbers with same denominators						X	
Adding mixed numbers with different denominators						X	
Adding three or more mixed numbers						X	
Subtracting fractions with different denominators						X	
Subtracting mixed numbers with same denominator, no renaming						X	
Subtracting mixed numbers with same denominator, renaming						X	
Subtracting mixed numbers with different denominators, no renaming						X	
Subtracting mixed numbers with different denominators with renaming						X	
Multiplying fractions						X	
Multiplying a fraction and a whole number						X	
Multiplying mixed numbers						X	
Finding cross-products for fractions							X
Reciprocals							X
Dividing by a fraction							X
Dividing by a mixed number							X

MATHEMATICS

Decimals

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Writing decimals: tenths, hundredths					X		
Adding decimals					X		
Subtracting decimals					X		
Writing decimals: thousandths						X	
Multiplying decimals						X	
Multiplying decimals by 10, 100, and 1000						X	
Writing decimals through millionths							X
Dividing decimals by a whole number							X
Dividing decimals by decimals							X
Dividing decimals by 10, 100, and 1000							X

MATHEMATICS

Ratios and Proportions

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Completing Tables		X			↓		
Writing ratios					X		
Finding equal ratios by extending lists					X		
Finding equal ratios by multiplying					X		
Writing cross-products for ratios						X	
Finding missing numbers in equal ratios by using cross-products						X	

MATHEMATICS

Percent

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Meaning of							X
Write percents as decimals							X
Write decimals as percents							X
Write fractions as percent							X
Write percent as a fraction							X
Finding a percent of a number							X
Finding what percent one number is of another							X

MATHEMATICS

Graphing

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Read bar graphs	X	↓	↓	↓	↓	↓	↓
Make bar graphs	X	↓	↓	↓	↓	↓	↓
Complete and interpret bar graphs		X	↓	↓	↓	↓	↓
Ordered pairs: locate positions on a grid		X	↓	↓	↓	↓	↓
Ordered pairs: give ordered pairs for points		X	↓	↓	↓	↓	↓
Read pictographs		X	↓	↓	↓	↓	↓
Interpret pictographs			X	↓	↓	↓	↓
Read line graphs					X	↓	↓
Interpret and make line graphs						X	↓
Read circle graphs							X
Interpret and make circle graphs							X

MATHEMATICS

Geometry

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Shapes	X						
Shapes with corners	X						
Preparation for congruence	X						
Mirror pictures	X						
Three-dimensional shapes		X					
Congruent figures		X					
Inside of closed figures		X					
Triangle, square, rectangle		X					
Circle		X					
Open and closed figures			X				
Sides and corners of polygons			X				
Measuring sides of polygons			X				
Readiness for perimeter			X				
Symmetry			X				
Coordinate geometry-giving ordered pairs for points; locating points for ordered pairs			X				
Pentagon, octagon				X			
Segment				X			
Diagonal				X			
Angle, right angle				X			
Circle-radius diameter				X			
Congruence-segments				X			

Geometry

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Cube				X	↓		
Similar objects				X	↓		
Polygon, regular polygon, quadrilateral parallelogram					X		
Point, endpoint, line, ray, parallel lines, intersecting lines					X		
Constructions					X		
Coordinate geometry-graphing function rules, finding function rules					X	↓	↓
Scalene, isosceles, equilateral triangles						X	
Perpendicular lines						X	
Angles-acute and obtuse						X	
Sum of angle measures						X	
Congruent angles						X	
Prism, pyramid-faces, vertices, edges						X	
Similar figures						X	↓
Central angle							X
Polyhedron							X
Cylinder and sphere							X
Coordinate geometry-moving and enlarging figures on a grid, four quadrants							X

MATHEMATICS

Measurement

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Preparation for linear measure; taller-shorter, longer-shorter	X	↓	↓	↓	↓	↓	
Ordering by height or length	X	↓	↓	↓	↓	↓	
Use of nonstandard units of length		X	↓	↓	↓	↓	
Metric unit: centimeter		X	↓	↓	↓	↓	
English units: inch, pint, quart		X	↓	↓	↓	↓	
Time: hour, half-hour		X	↓	↓	↓	↓	
Calendar		X	↓	↓	↓	↓	
Time: quarter-hour			X	↓	↓	↓	
Measuring sides of polygons			X	↓	↓	↓	
Readiness for perimeter			X	↓	↓	↓	
Body units				X	↓	↓	
Metric units: meter, liter				X	↓	↓	
English units: half-inch, foot, yard, gallon				X	↓	↓	
Time: minute				X	↓	↓	
Perimeter				X	↓	↓	
Area: counting square units				X	↓	↓	
Volume: counting cubic units				X	↓	↓	
Estimating				X	↓	↓	
Finding equivalent measures				X	↓	↓	
Metric units: kilometer, kilogram, gram					X	↓	
English units of measure: fourth-inch, mile, ounce, pound, ton					X	↓	

Measurement

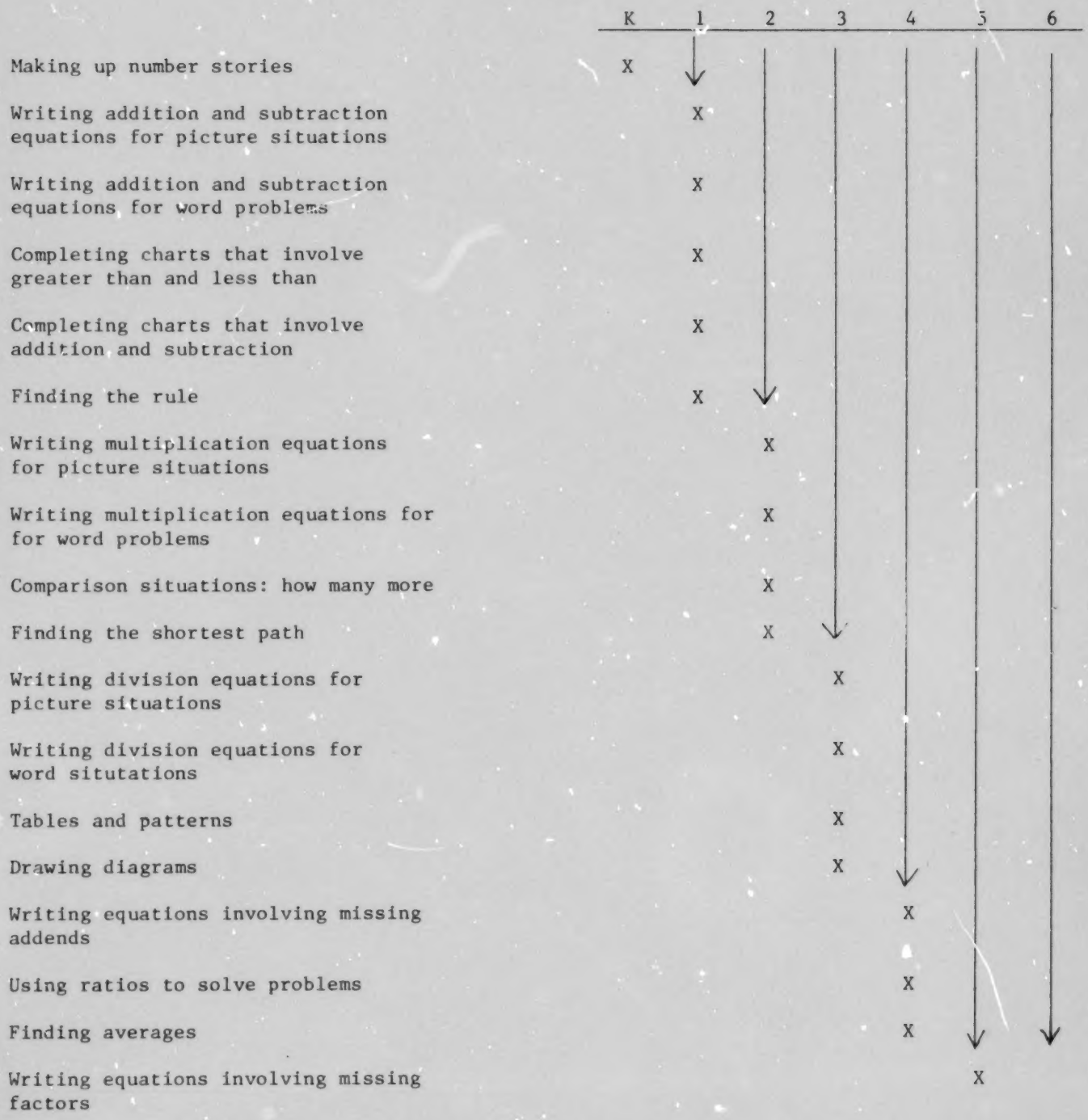
SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Temperature: Celsius, Fahrenheit					X		
Metric units: millimeter, milliliter						X	
English unit: eighth inch						X	
Area formula: rectangle, triangle						X	
Volume formula						X	
Angle measure						X	
Metric unit: milligram							X
Surface area							X

MATHEMATICS

Problem Solving

SCOPE AND SEQUENCE


K
1
2
3
4
5
6
Making up number stories
Writing addition and subtraction equations for picture situations
Writing addition and subtraction equations for word problems
Completing charts that involve greater than and less than
Completing charts that involve addition and subtraction
Finding the rule
Writing multiplication equations for picture situations
Writing multiplication equations for for word problems
Comparison situations: how many more
Finding the shortest path
Writing division equations for picture situations
Writing division equations for word situtations
Tables and patterns
Drawing diagrams
Writing equations involving missing addends
Using ratios to solve problems
Finding averages
Writing equations involving missing factors

Problem Solving

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Using formulas to find area						X	
Using formulas to find volume						X	
Using formulas to find circumference						X	↓
Making graphs							X
Percent							X

MATHEMATICS

Applications

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Money: penny	X						
Making bar graphs	X						
Logical reasoning	X						
Completing patterns	X						
Earning and spending	X						
Completing and interpreting bar graphs		X					
Recording data and making conclusions		X					
Calendar		X					
Telling time: hour, half hour		X					
Ordered pairs: locate positions on a grid		X					
Counting by ones, tens, fives, twos		X					
Money: nickel, dime		X					
Counting money		X					
Number-line sequences		X					
Counting sequences		X					
Number patterns		X					
Function tables		X					
Common attributes		X					
Puzzles		X					
Interpreting pictorgraphs			X				
Money: quarter			X				
Time: quarter hour			X				

Applications

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Finding shortest path			X				
Codes			X				
Cross-number puzzles			X				
Money: half dollar, dollar				X	↓	↓	↓
Time: five minutes				X			
Earth science				X			
Biology				X			
Transportation				X			
Literature and adventure				X			
Sports and leisure time				X			
Magic squares and figurative numbers				X	↓		
Recording data and drawing conclusions					X		
Averages					X		
Scale drawing					X		
Geography					X		
History					X		
Space					X		
Careers					X		
Number tricks					X	↓	
Line graphs						X	
Maps and scale drawings						X	
Writing fractions for experiments						X	↓

Applications

SCOPE AND SEQUENCE

	K	1	2	3	4	5	6
Making predictions						X	↓
Circle graphs							X

GRADED COURSE OF STUDY

MATHEMATICS

GRADE SEVEN

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Numbers and Numeration

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Sets:

   Set (B)
   Member, element (B)
   Subset (B)
   Finite set (B)
   Infinite set (B)
   Null, empty set (B)
   Universal set (B)
   Venn diagram (B)
   Union of sets (B)
   Intersection of sets (B)
   Complementation of sets (B)

2. Systems of Numeration:

   Natural number set (B)
   Whole number set (B)
   Place value (A)
   Reading and writing numerals (A)
   Selected ancient number systems (A)
   Selected modern number systems (B)
   Expanded numerals (A)
   Exponents, bases, powers
   Set of integers (C)

3. Order:

   Number line (A)
   Number series (A)
   Ordinal numbers (A)
   Cardinal numbers (A)
   Counting by 2, 5, 10, etc. (A)
   Less than (A)
   Greater than (A)
   Equality (A)
   Inequality (A)
   Ordering numbers (A)
   Comparing numbers (A)

4. Number Theory:

Tests of divisibility (A)
Prime numbers (A)
Composite numbers (A)
Sieve of Eratosthenes (B)
Prime factorization (A)
Greatest common factor (A)
Multiples (A)
Least common multiple (B)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Addition

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Definition of Addition (A)

2. Addend (A)

3. Addition Facts (A)

4. Addition of Multi-Digit Whole Numbers Without Regrouping (A)

5. Regrouping (A)

6. Addition of Multi-Digit Whole Numbers With Regrouping (A)

7. Estimation (B)

8. Properties of Addition (B)

   Property of zero
   Commutative property
   Associative property

9. Addition of Integers (C)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Subtraction

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Definition of Subtraction (A)
2. Minuend (A)
3. Subtrahend (A)
4. Difference, Remainder (A)
5. Subtraction Facts (A)
6. Subtraction of Multi-Digit Whole Numbers Without Regrouping (A)
7. Regrouping (A)
8. Subtraction of Multi-Digit Whole Numbers With Regrouping (A)
9. Estimation (B)
10. Properties of Subtraction (A)

    Relationship to addition (inverse)
    Property of zero

11. Subtraction of Integers (C)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Multiplication

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Definition of Multiplication (A)
2. Factor (Multiplier, Multiplicand) (A)
3. Product (A)
4. Multiplication Facts (A)
5. Multiplication of Multi-Digit Whole Numbers Without Regrouping (A)
6. Regrouping (A)
7. Multiplication of Multi-Digit Whole Numbers With Regrouping (A)
8. Estimation (B)
9. Properties of Multiplication (A)

    Property of one
    Commutative property
    Associative property
    Distributive property

10. Multiplication of Integers (C)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Division

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Definition of Division (A)
2. Dividend, Divisor, Quotient (A)
3. Remainder (A)
4. Division Facts (A)
5. Short Division (A)
6. Long Division Without Remainders of Multi-Digit Dividends by One, Two, and Three Digit Divisors (A)
7. Long Division With Remainders of Multi-Digit Dividends by One, Two, and Three Digit Divisors (A)
8. Estimation (B)
9. Checking (A)
10. Properties of Division (A)

    Relationship to multiplication (inverse)
    Property of one
    Zero in division

11. Division of Integers (C)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Fractions

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Definition of a Fraction (A)

2. Numerator (A)

3. Denominator (A)

4. Equivalent Fractions

   Reducing fractions to lowest terms (A)
   Raising fractions to higher terms (A)
   Regrouping fractions (A)
   Improper fractions (A)
   Proper fractions (A)
   Mixed numbers (A)

5. Comparing Fractions

   Less than (A)
   Greater than (A)
   Cross multiplying (B)

OPERATIONS WITH FRACTIONS

1. Addition

   Definition of addition (A)
   Definition of the common denominator (A)
   Adding fractions with common denominators (A)
   Finding the least common denominator (B)
   Adding fractions and mixed numbers without the least common denominator (B)

2. Subtraction

   Definition of subtraction (A)
   Subtractions of fractions with the common denominator (A)
   Subtraction of fractions with mixed numbers without the common denominator (B)

3. Multiplication

   Definition of multiplication (A)
   Multiplication of fractions (A)
   Multiplication of mixed numbers (A)
   Common factors (A)

4. Division

   Definition of division (A)
   Complex fractions (A)
   Division of fractions (A)
   Division of mixed numbers (A)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Decimals

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Definition of a Decimal Fraction (A)
2. Place Value (A)
3. Reading & Writing Decimals (A)
4. Rounding Decimals (A)
5. Expressing Fractions as Decimals (A)
6. Expressing Decimals as Fractions (A)
7. Terminating Decimals (B)
8. Repeating Decimals (B)
9. Addition of Decimals (A)
10. Subtraction of Decimals (A)
11. Multiplication of Decimals (A)
12. Division of Decimals (A)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Ratios and Proportions

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Concept of Comparison (A)
2. Definition of Ratio (A)
3. Writing Ratios in Various Forms (B)
4. Equal Ratios by Extending Lists (A)
5. Equal Ratios by Cross-Products (B)
6. Definition of Proportion (B)
7. Finding Missing Members of a Proportion (B)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Percent

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Definition of Percent (A)
2. Expressing Fractions as Percents (A)
3. Expressing Percents as Fractions (A)
4. Expressing Decimals as Percents (A)
5. Expressing Percents as Decimals (A)
6. Fractional Percents (B)
7. Finding a Percent of a Number (B)
8. Finding What Percent One Number is of Another (C)
9. Finding the Whole (C)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Graphing

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Definition of a Graph (A)
2. Reading and Interpreting Line, Bar, Circle, and Pictographs (A)
3. Construction of Line, Bar, Circle, and Pictographs (B)
4. Axis-Number Line (C)
5. Axis-X-Y Coordinate System (C)
6. Ordered Pairs (C)
7. Plotting Ordered Pairs (C)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Geometry

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Point (A)
2. Line (A)
3. Line Segment (A)
4. Ray (A)
5. Parallel Lines (A)
6. Transversal (B)
7. Vertical Angles (B)
8. Corresponding Angles (B)
9. Alternate Interior Angles (B)
10. Acute Angle (A)
11. Obtuse Angle (A)
12. Right Angle (A)
13. Straight Angle (B)

PLANE FIGURES

1. Simple Closed Figure (A)
2. Polygon (A)
3. Triangle (A)

    Acute (A)
    Right (A)
    Obtuse (A)
    Scalene (A)
    Isosceles (A)
    Equilateral (A)

4. Quadrilateral (A)

    - Trapezoid (A)
    - Parallelogram (A)
    - Rectangle (A)
    - Square (A)

5. Pentagon (A)

6. Hexagon (A)

7. Octagon (A)

8. Decagon (A)

9. Circle (A)

    - Center (A)
    - Radius (A)
    - Diameter (A)
    - Circumference (B)

SPACE FIGURES (THREE DIMENSIONAL)

1. Rectangular Solid (B)

2. Cube (B)

3. Sphere (B)

4. Prisms (B)

5. Pyramid (B)

6. Cone (B)

PERIMETERS OF PLANE FIGURES (B)

AREAS OF PLANE FIGURES

1. Square (C)

2. Rectangle (C)

3. Parallelogram (C)

4. Triangle (C)

5. Trapezoid (C)

6. Circle (C)

Geometry

GRADE SEVEN

SURFACE AREA OF SPACE FIGURES (THREE DIMENSIONAL)

1. Cube (C)
2. Prisms (C)
3. Sphere (C)
4. Cylinder (C)

VOLUMES OF SPACE FIGURES (THREE DIMENSIONAL)

1. Cube (C)
2. Rectangular Solid (C)
3. Prisms (C)
4. Cylinder (C)
5. Sphere (C)
6. Pyramid (C)
7. Cone (C)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Measurement

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Definition of Measurement (A)
2. History of the Metric System (A)
3. Metric Prefixes (A)
4. Units of Linear Measurement (A)
5. Units of Capacity Measurement (A)
6. Units of Weight (Mass) Measurement (A)
7. Conversions Within the Metric System (A)
8. Use of Measuring Tools (A)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Problem Solving

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Reading in Mathematics (A)
2. Gathering, Organizing and Interpreting Data (A)
3. Analyzing and Conceptualizing Problems (A)
4. Defining the Problem and Goal (A)
5. Strategies of Interaction and Simulation (A)
6. Experimenting (A)
7. Transferring Skills and Strategies to New Situations (A)
8. Stimulation of Curiosity and Exploration (A)
9. Concept of Programming (B)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Applications

GRADE SEVEN

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Top Two Groups
C - Top Group Only

BASIC TOPICS

1. Purchasing (A)
2. Comparison Shopping (A)
3. Discounts (B)
4. Taxes (B)
5. Utilities (B)
6. Insurance (B)
7. Finance Charges (B)
8. Sports (A)
9. Current Events (A)
10. Science (B)
11. Use of the Calculator (A)
12. Introduction to the Micro-Computer (A)

GRADED COURSE OF STUDY

MATHEMATICS

GRADE EIGHT

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Numbers and Numeration

GRADE EIGHT

Strand 1

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. General Topics

   Factors (A)
   Divisibility tests (A)
   Primes (A)
   Composites (A)
   Greatest common factor (A)
      Euclidean Algorithm (B)
   Least common multiple (B)

2. Base Ten

   Place value (A)
      Digits (A)
   Standard form (A)
   Expanded form (A)
   Exponential form (A)
      Exponent (A)
      Base (A)
      Powers (A)
         Squared (A)
         Cubed (A)

3. Base Two (B)

   Place value (B)
   Changing from base two to base ten (B)
   Changing from base ten to base two (B)
      Applications to computer theory (B)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Addition

GRADE EIGHT

Strand 2

The topic listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Addition of Whole Numbers (A)

   Parts of an addition problem (A)
   - Addends (A)
   - Sum (A)

   Checking addition of whole numbers (A)
   - Adding in reverse (A)
   - Subtraction (A)

2. Properties of Addition (B)

   Addition property of zero (B)
   - Additive identity (B)

   Commutative property of addition (B)

   Associative property of addition (B)

3. Estimation in Addition (A)

   Purpose (A)

   Uses in problem solving (A)

4. Addition of Integers (B)

   Using a diagram to add integers (B)

   Using the number line (B)

   Using rules for addition (B)
   - Absolute value (B)

5. Addition of Measures (A)

   Time (A)

   Weight (A)

   Linear (A)

   Volume (A)

Addition

GRADE EIGHT

Strand 2

6. Addition of Rationals (B)

   Rules the same as for addition for integers (B)

7. Using Addition to Solve Equations (B)

   Solving addition type equations (B)
   Solving subtraction type equations using addition (B)
   Applications of addition to story problems (B)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Subtraction

GRADE EIGHT

Strand 3

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Subtraction of Whole Numbers (A)

   Parts of a subtraction problem (A)
      Minuend (A)
      Subtrahend (A)
      Difference (A)
   Checking subtraction by addition (A)

2. Estimation in Subtraction (A)

   Purpose (A)
   Uses in problem solving (A)

3. Subtraction of Integers (B)

   Use of diagram (B)
   Use of number line (B)
   Use of rule (B)
      Additive inverse (B)
         Opposite (B)

4. Subtraction of Rationals (B)

   Rules for rationals the same as for integers (B)

5. Subtraction of Measures (A)

   Time (A)
   Weight (A)
   Linear (A)
   Volume (A)

6. Using Subtraction to Solve Equations (B)

   Solving subtraction type equations (B)
   Solving addition type equations using subtraction (B)
   Applications of subtraction to story problems (B)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Multiplication

GRADE EIGHT

Strand 4

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Multiplication of Whole Numbers (A)

   Parts of a multiplication problem (A)
      Multiplicand (A)
      Multiplier (A)
      Factors (A)
      Partial products (A)
      Product (A)
   Checking multiplication of whole numbers (A)
      Using the commutative property (B)
      Using division (A)

2. Properties of Multiplication (B)

   Multiplication property of zero (B)
   Multiplication property of one (B)
      Multiplicative identity (B)
   Commutative property of multiplication (B)
   Associative property of multiplication (B)
   Distributive property (B)

3. Estimation of Multiplication (A)

   Purpose (A)
   Uses in problem solving (A)

4. Multiplication of Integers (B)

   Use of a diagram (B)
   Use of number line (B)
   Use of rules of multiplication (B)

5. Multiplication of Rationals (B)

   Rules for multiplication the same as for integers (B)

Multiplication

GRADE EIGHT

Strand 4

6. Using Multiplication to Solve Equations (B)

Solving multiplication type equations (B)
Solving division type equations using multiplication (B)
Application of multiplication to story problems (B)

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COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Division

GRADE EIGHT

Strand 5

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Division of Whole Numbers (A)

   Parts of a division problem (A)
      Divisor (A)
      Dividend (A)
      Quotient (A)
      Remainder (A)
   Checking division by multiplication (A)
   Applications (A)

2. Estimation in Division (A)

   Purpose (A)
   Use in problem solving (A)

3. Division of Integers (B)

   Using diagram (B)
   Using number line (B)
   Using rules for division (B)

4. Division of Rationals (B)

   Rules the same as division of integers (B)

5. Using Division to Solve Equations (B)

   Solving division type equations (B)
   Solving division type equations using multiplication by reciprocal (B)
   Application of division to story problems (B)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Fractions

GRADE EIGHT

Strand 6

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Review of Terminology

   Numerator (A)
   Denominator (A)
   Common fraction (A)
   Proper fraction (A)
   Improper fraction (A)
   Mixed fraction (A)

2. Operations With Fractions (A)

   Simplifying fractions (A)
   Least common denominator (A)
   Renaming fractions (A)
   Equivalent fractions (A)
   Comparing fractions (A)
      Using common denominators (A)
      Using cross products (A)
   Addition of fractions (A)
      Addition with like denominators (A)
      Addition with unlike denominators (A)
   Subtraction of fractions (A)
      Subtraction with like denominators (A)
      Renaming in subtraction (A)
      Subtraction with unlike denominators (A)
   Multiplication of fractions (A)
      Multiplication with mixed numerals (A)
   Reciprocals (A)
   Division of fractions (A)
      Division with mixed numerals (A)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Decimals

GRADE EIGHT

Strand 7

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Reading Decimals (A)
2. Writing Decimals (A)
3. Rounding Decimals (A)
4. Comparing Decimals (A)
5. Addition of Decimals (A)
6. Subtraction of Decimals (A)
7. Multiplication of Decimals (A)
8. Division of Decimals (A)

   Rounding quotients (A)
9. Multiplication by 10, 100, and 1000 (A)
10. Division by 10, 100, and 1000 (A)
11. Converting Fractions to Decimals (A)

    Terminating decimals (A)
    Non-Terminating decimals (A)
    Repeating decimals (A)
12. Converting Decimals to Fractions (A)

    Changing repeating decimals to common fractions (B)
13. Application of Decimals (A)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Ratios and Proportions

GRADE EIGHT

Strand 8

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Ratio (A)

2. Rates (B)

   Unit rate (B)

3. Proportion (A)

   Cross products (A)
   Similar figures (B)

4. Scale Drawings (B)

5. Proportions Used to Solve Percent Problems (A)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Percent

GRADE EIGHT

Strand 9

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Percent Compared to 100 (A)
2. Fractions to Percent (A)
3. Decimals to Percent (A)
4. Percents to Fractions (A)
5. Percents to Decimals (A)
6. Finding the Percentage (A)
7. Finding the Percent (Rate) of a Number (A)
8. Finding the Base (B)
9. Finding Sales Tax (A)
10. Percent of Increase (B)
11. Percent of Decrease (B)
12. Finding Discount (B)
13. Interest (B)

    Simple interest (B)
    Compound interest (B)

14. Probability and Percent (B)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Graphing

GRADE EIGHT

Strand 10

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Pictographs (A)

2. Bar Graphs (A)

   Double bar graph (B)

3. Misleading Graphs (A)

4. Line Graphs (A)

   Double line graphs (B)

5. Circle Graphs (A)

6. Ordered Pair Graphs (B)

   Origin (B)
   Grids (B)

7. Graphing on the Number Line (A)

8. Coordinate Graphs (B)

   X-Coordinate (B)
   Y-Coordinate (B)
   X-Axis (B)

9. Graphing Equations (B)

10. Slope (B)

    Y-Intercept (B)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Geometry

GRADE EIGHT

Strand 11

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Review and Extension of Terminology (A)

- Point (A)
- Line (A)
  - Intersecting (A)
  - Parallel (A)
  - Skew (B)
- Line segment (B)
- Plane (B)
  - Intersecting (B)
  - Parallel (B)
- Space (A)
- Vertex (A)
- Angle (A)
  - Right (A)
  - Acute (A)
  - Obtuse (A)
  - Straight (A)
  - Reflex (B)
- Congruent (A)
- Angles formed by intersecting lines (B)
  - Verticle (B)
  - Perpendicular (A)
  - Complementary (B)
  - Supplementary (B)
- Transversal to parallel lines (B)
  - Corresponding angles (B)
  - Alternate interior angles (B)
  - Alternate exterior angles (B)

2. Simple Closed Figures (A)

- Circles (A)
  - Radius (A)
  - Diameter (A)
  - Chord (A)
  - Pi (A)

Polygons (A)
- Triangle (A)
  - Equilateral (A)
  - Isosceles (A)
  - Scalene (A)
  - Right (A)
  - Obtuse (A)
  - Acute (A)
- Quadrilateral (A)
  - Parallelogram (A)
  - Rectangle (A)
  - Square (A)
  - Rhombus (A)
  - Trapezoid (A)
  - Pentagon (A)
  - Hexagon (A)
  - Octagon (A)
  - Decagon (A)

3. Three Dimensional Figures (A)

- Tetrahedron (B)
- Cube (A)
- Rectangular prism (A)
- Pyramid (B)
- Sphere (B)

4. Geometric Construction (A)

- Segments (A)
  - Copying segments (A)
  - Bisecting segments (A)
- Angles (A)
  - Copying angles (A)
  - Bisecting angles (A)
- Parallel lines (B)
- Perpendicular lines (A)
  - Through a point on a line (A)
  - From a point to a line (A)
- Finding centers of circles (B)
- Triangles (B)
  - Equilateral (B)
  - Scalene (B)
  - Isosceles (B)
- Quadrilaterals (B)
  - Parallelogram (B)
  - Rectangle (B)
  - Square (B)
  - Rhombus (B)

Hexagons

5. Perimeter and Circumference of Simple Closed Figures (A)

Triangles (A)
- Scalene (A)
- Isosceles (A)
- Equilateral (A)

Quadrilaterals (A)
- Square (A)
- Rectangle (A)
- Parallelogram (B)
- Rhombus (B)
- Trapezoid (B)

Circles (circumference)
- Pi and how it is found (B)

Other regular and irregular simple closed figures (B)
- Pentagon (B)
- Hexagon (B)
- Decagon (B)

6. Area of Simple Closed Figures (A)

Rectangle (A)
Square (A)
Parallelogram (B)
Triangle (A)
Trapezoid (B)
Circle (A)
Other regular and irregular simple closed figures (B)

7. Surface Area of Solids (B)

Cube (B)
Rectangular prism (B)
- Lateral area (B)
- Total area (B)

Cylinder (B)
- Lateral area (B)
- Total area (B)

Pyramid (B)
Sphere (B)
Combinations of the above (B)

8. Volume of Solids (B)

Cube (B)
Rectangular prism (B)
Triangular prism (B)

Cylinder (B)
Pryamid (B)
Cone (B)
Sphere (B)
Combination of the above (B)

9. Congruency of Triangles (B)

Side, side, side (B)
Side, angle, side (B)
Angle, side, angle (B)

10. Similarity of Triangles (B)

Corresponding angles (B)
Corresponding sides (B)
Proportions (B)
Finding missing sides of similar triangles (B)
Indirect measurement (B)
30-60 right triangles (B)

11. Pythagorean Theorem (B)

Right triangle (B)
Hypotenuse (B)
Leg (B)
Square root (B)
Use of table (B)
By approximation (B)
Division Algorithm (B)

12. Trigonometric Ratios (B)

Sine (B)
Finding (B)
Use of (B)
Cosine (B)
Finding (B)
Use of (B)
Tangent (B)
Finding (B)
Use of (B)
Interpolation (B)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Measurement

GRADE EIGHT

Strand 12

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Standard Measurement (A)

   Nearest inch (A)
   Nearest one-eighth inch (A)
   Nearest one-quarter inch (A)
   Nearest one-half inch (A)
   Total measurement using the above (A)

2. Metric Measure (A)

   Linear measure (A)
   Meter (A)
   Kilometer (A)
   Millimeter (B)
   Centimeter (A)
   Conversions within the metric system (B)

3. Precision in Measurement (B)

   Greatest possible error (B)

4. Metric Measure of Mass (B)

   Kilogram (B)
   Gram (B)

5. Metric Measure of Capacity (B)

   Liter (B)
   Milliliter (B)

6. Temperature (B)

   Fahrenheit (B)
   Celsius (B)

Measurement

GRADE EIGHT

Strand 12

7. Scientific Notation (B)

8. Time Zones (A)

9. Adding and Subtracting Measures (B)

10. Measurement of Angles (A)

    Angles of triangles (A)
    Angles of other polygons (B)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Problem Solving

GRADE EIGHT

Strand 13

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Addition (A)

2. Subtraction (A)

3. Multiplication (A)

4. Division (A)

5. Mathematical Expressions (A)

    Order of operations (A)
        Symbols of inclusion (A)
            Parentheses (A)
            Brackets (A)
            Braces (B)
            Vinculum (B)
        Evaluation of powers (B)
        Doing all multiplications and/or divisions in order of appearance from left to right (B)
        Doing all additions and/or subtractions in order from left to right (B)
    Evaluating expressions (B)
        Substitution (B)
        Symbols of inclusion (B)
        Order of operations (B)
    Evaluating formulas (B)
        Applications (B)

6. Solving Problems Using Proportions (B)

7. Solving Problems Using Percent (B)

8. Probability (B)

    Odds (B)

Problem Solving

GRADE EIGHT

Strand 13

9. Five Steps to Solving an Algebraic Story Problem (B)

    Heading (B)
    Equation (B)
    Solution (B)
    Root (B)
    Check (B)

10. Statistics (B)

    Organizing data (B)
        Mode (B)
        Range (B)
        Frequency (B)
        Mean (average) (B)
        Median (B)
        Mean variation (B)
    Statistics sampling (B)
        Predicitions (B)
        Misuses of statistics (B)

11. Sequences (B)

12. Squares (A)

13. Square Roots (B)

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Applications

GRADE EIGHT

Strand 14

The topics listed below, within each strand, indicate at which level the concept is covered:

A - All Students
B - Average Students Only

BASIC TOPICS

1. Writing Checks (A)

   Savings accounts (A)
   Reconciling a checking account (A)

2. Universal Product Code (A)

3. Timecard (A)
   Hourly rate (B)

4. Social Security Card (A)

5. Rule of 78 for Interest (B)

6. Misleading Advertising (A)

7. Buying and Selling Antifreeze (B)

8. Income Tax (B)

9. Telephone Rates (B)

10. Deceptive Packaging (B)

11. Credit Cards (B)

12. Using Three Ratios (B)

13. Purchasing (B)

14. Utilities (B)

15. Insurance (B)

GRADED COURSE OF STUDY

MATHEMATICS

SCOPE AND SEQUENCE

(7 - 8)

MATHEMATICS

Numbers and Numeration

SCOPE AND SEQUENCE

	7	8
Betweeness	Previously taught K - 6	Previously taught K - 6
Order through thousands		
Counting by threes, fours		
Place value through hundred millions		
Rounding		
Roman numerals		
Prime numbers		
Square numbers		
Egyptian numerals		
Place value through hundred billions		
Multiples		
Factors		
Primes and composites		
Find prime factors		
Exponents		
Least common multiple		
Writing integers	X	
Comparing integers	X	
Greatest common factor	X	
Euclidean Algorithm		X

MATHEMATICS

Addition

SCOPE AND SEQUENCE

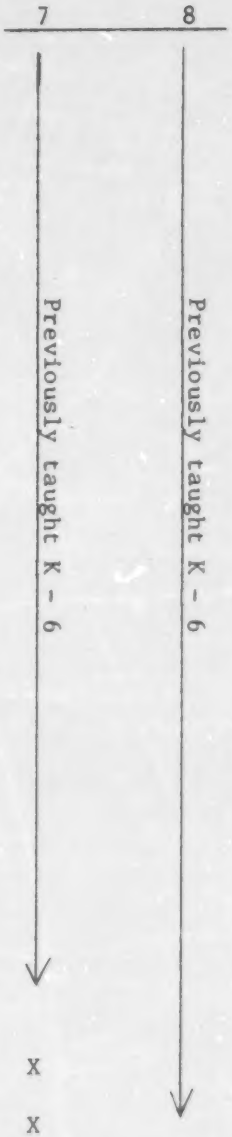
	7	8
Joining sets		
Meaning of addition		
Sums through twelve		
Zero as an addend		
Three addends with sums of twelve or less		
Families of facts		
Names for numbers		
Order property in addition		
Grouping property in addition		
Missing addend		
Sums through 18		
Use of a number track		
Three addends with sums of 18 or less		
Adding with one renaming		
Adding two-digit numbers		
Adding three-digit numbers		
Use of number line		
Adding three or more numbers		
Adding with two renamings		
Mental computation		
Adding with three or more renaming		
Estimating sums		
Adding integers		X

Previously taught K - 6

MATHEMATICS

Subtraction

SCOPE AND SEQUENCE

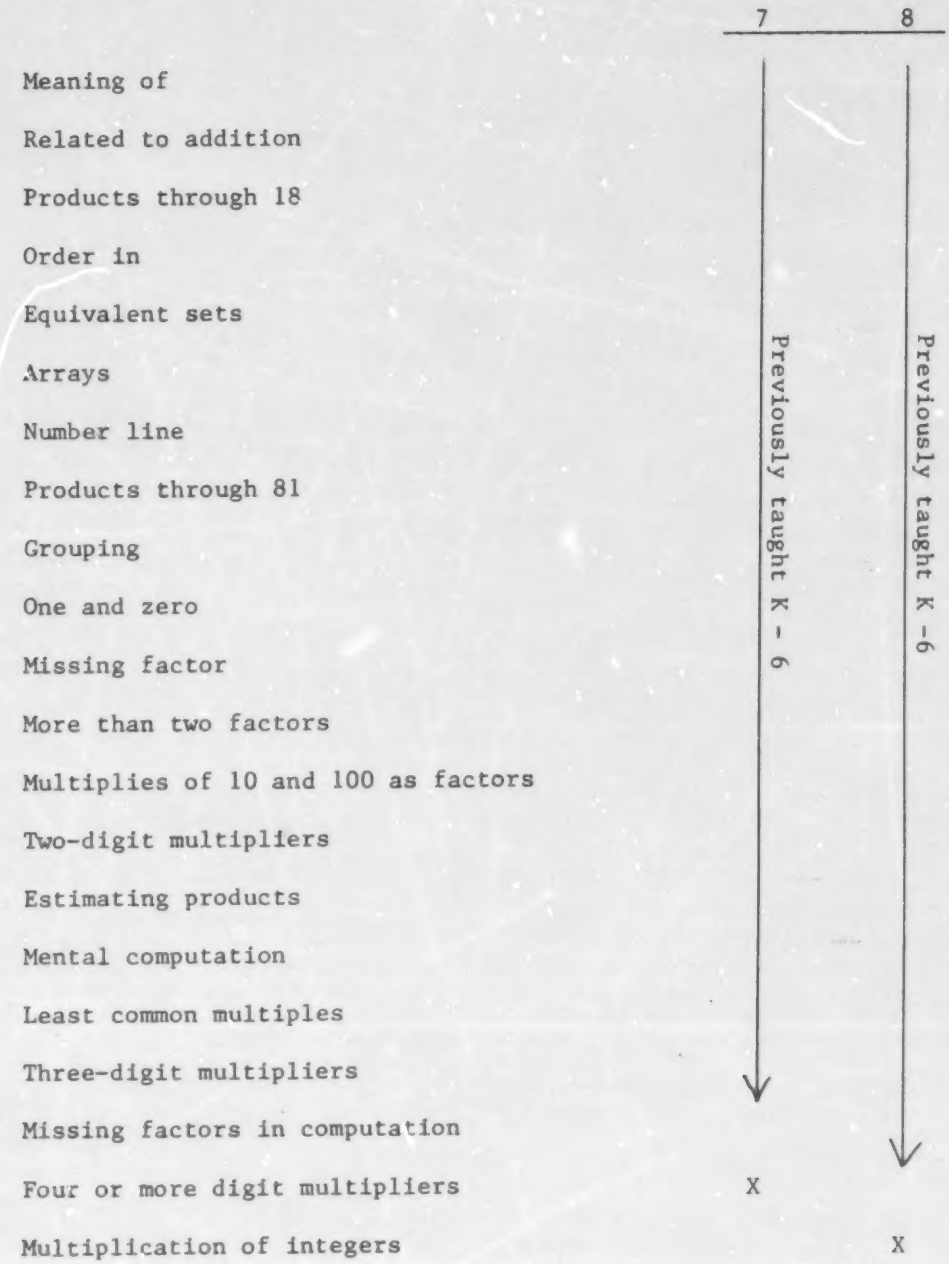


	7	8
Meaning		
Minuends of two through twelve		
Zero as a subtrahend or a difference		
Families of facts		
Names for numbers		
Minuends through 18		
Use of number track		
Preparation for renaming		
Subtracting with one renaming		
Subtracting two-digit numbers		
Subtracting three-digit numbers		
Use of a number line		
Subtracting with two renamings		
Checking by adding		
Subtracting with more than two renamings		
Related to addition		
Mental computation		
Subtracting numbers with more than three digits	X	
Estimating	X	
Subtraction of integers		X

MATHEMATICS

Multiplication

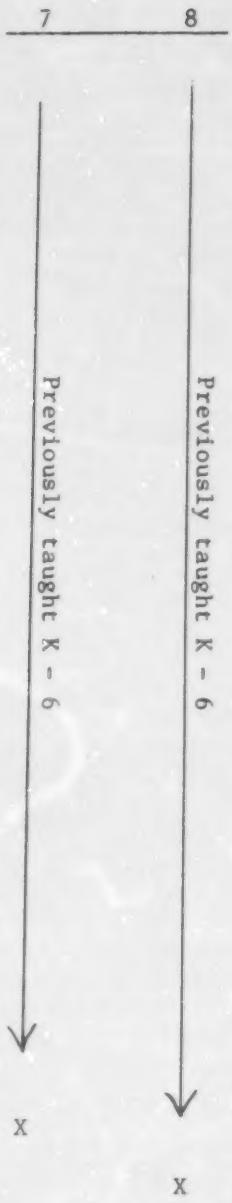
SCOPE AND SEQUENCE



MATHEMATICS

Division

SCOPE AND SEQUENCE

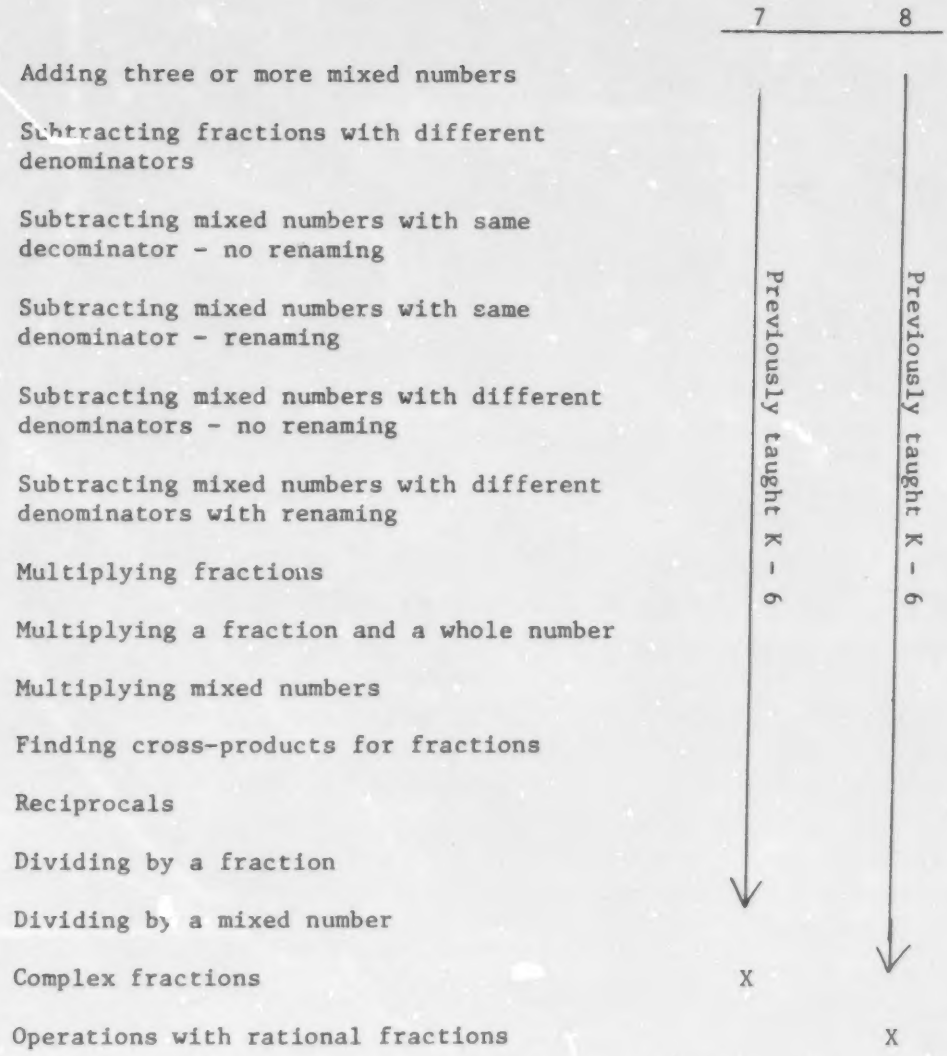


	7	8
Meaning of		
Equivalent sets		
Arrays		
Number line		
Dividends through 81		
Related to subtraction		
Related to multiplication		
One and zero		
One-digit divisors-one-digit quotients		
One-digit divisors-two-digit quotients		
Two-digit divisors-one digit quotients		
Remainders		
Two-digit divisors-two-digit quotients		
Checking division		
One-digit divisors-three digit quotients		
Expressing quotients as mixed numbers		
Three-digit divisors		
Zeros in the quotient		
Estimating quotients	X	
Division of integers		X

MATHEMATICS

Fractions

SCOPE AND SEQUENCE


7
8
Adding three or more mixed numbers
Subtracting fractions with different denominators
Subtracting mixed numbers with same decominator - no renaming
Subtracting mixed numbers with same denominator - renaming
Subtracting mixed numbers with different denominators - no renaming
Subtracting mixed numbers with different denominators with renaming
Multiplying fractions
Multiplying a fraction and a whole number
Multiplying mixed numbers
Finding cross-products for fractions
Reciprocals
Dividing by a fraction
Dividing by a mixed number
Complex fractions
Operations with rational fractions
Previously taught K - 6
Previously taught K - 6
X
X

MATHEMATICS

Decimals

SCOPE AND SEQUENCE

	7	8
Writing decimals: tenths, hundredths	Previously taught K - 6 ↓	
Adding decimals		
Subtracting decimals		
Writing decimals: thousandths		
Multiplying decimals		
Multiplying decimals by 10, 100, and 1000		
Writing decimals through millionths		
Dividing decimals by a whole number		
Dividing decimals by decimals		
Dividing decimals by 10, 100, and 1000		
Converting fractions to decimals	X	
Converting decimals to fractions	X	
Repeating decimals	X	
Terminating decimals	X	
Comparing decimals	X	
Estimating	X	

MATHEMATICS

Ratios and Proportions

SCOPE AND SEQUENCE

	7	8
Completing tables	Prev. taught K - 6 ↓	
Writing ratios		
Finding equal ratios by extending lists		
Finding equal ratios by multiplying		
Writing cross-products for ratios		
Finding missing numbers in equal ratios by using cross-products		
Proportion	X	

MATHEMATICS

Percent

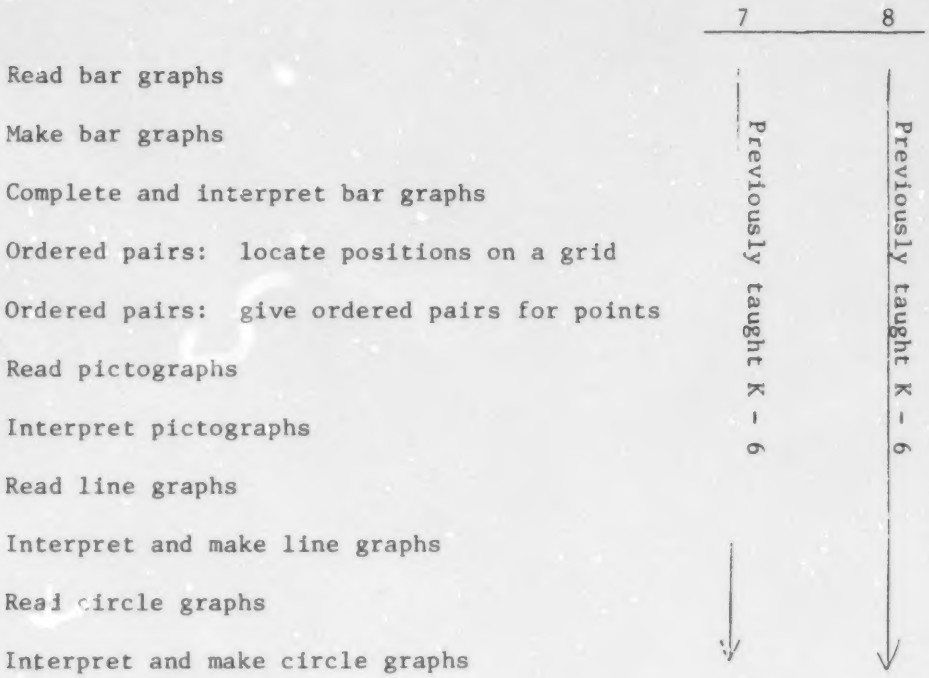
SCOPE AND SEQUENCE

	7	8
Meaning of	Prev. taught K - 6 ↓	Previously taught K - 6 ↓
Write percents as decimals		
Write decimals as percents		
Write fractions as a percent		
Write percent as a fraction		
Finding a percent of a number		
Finding what percent one number is of another		
Fractional percents	X	
Percents greater than 100	X	
Finding the whole		X

MATHEMATICS

Graphing

SCOPE AND SEQUENCE



MATHEMATICS

Geometry

SCOPE AND SEQUENCE

	7	8
Shapes		
Shapes with corners		
Preparation for congruence		
Mirror pictures		
Three-dimensional shapes		
Congruent figures		
Inside of closed figures		
Triangle, square, rectangle		
Circle		
Open and closed figures		
Sides and corners of polygons		
Measuring sides of polygons		
Readiness for perimeter		
Symmetry		
Coordinate geometry-giving ordered pairs for points; locating points for ordered pairs		
Pentagon, octagon		
Segment		
Diagonal		
Angle, right angle		
Circle-radius diameter		
Congruence-segments		
Cube		
Similar objects		

Geometry

SCOPE AND SEQUENCE

	7	8
Polygon, regular polygon, quadrilateral parallelogram	Previously taught K - 6	Previously taught K - 6
Point, endpoint, line, ray, parallel lines, intersecting lines		
Constructions		
Coordinate geometry-graphing function rules, finding function rules		
Scalene, isosceles, equilateral triangles		
Perpendicular lines		
Angles-acute and obtuse		
Sum of angle measures		
Congruent angles		
Prism, pyramid-faces, vertices, edges		
Similar figures		
Central angle		
Polyhedron		
Cylinder and sphere		
Coordinate geometry-moving and enlarging figures on a grid, four quadrants		
Straight-reflex angles	X	X

MATHEMATICS

Measurement

SCOPE AND SEQUENCE

	7	8
Preparation for linear measure; taller-shorter, longer-shorter		
Ordering by height or length		
Use of nonstandard units of length		
Metric unit-centimeter		
English units, inch, pint, quart		
Time-hour, half hour		
Calendar		
Time-quarter hour		
Measuring sides of polygons		
Readiness for perimeter		
Body units		
Metric units-meter, liter		
English units-half-inch, foot, yard, gallon		
Time-minute		
Perimeter		
Area: counting square units		
Volume: counting cubic units		
Estimating		
Finding equivalent measures		
Metric units-kilometer, kilogram gram		
English units of measure-fourth inch, mile, ounce, pound, ton		
Temperature-Celsius, Fahrenheit		

Previously taught K - 6

Previously taught K - 6

Measurement

SCOPE AND SEQUENCE

	7	8
Metric units-millimeter, milliliter	↓	↓
English unit-eighth inch		
Area formula-rectangle, triangle		
Volume formula		
Angle measure		
Metric unit-milligram		
Temperature-Kelvin	X	
Surface area	X	

MATHEMATICS

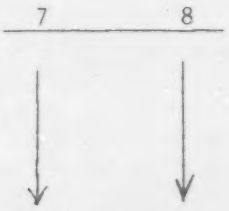
Problem Solving

SCOPE AND SEQUENCE

	7	8
Making up number stories	Previously taught K - 6	Previously taught K - 6
Writing addition and subtraction equations for picutre situations		
Writing addition and subtraction equations for word problems		
Completing charts that involve greater than and less than		
Completing charts that involve addition and subtraction		
Finding the rule		
Writing multiplication equations for picture situations		
Writing multiplication equations for word problems		
Comparison situations: how many more		
Finding the shortest path		
Writing division equations for picture situations		
Writing division equations for word situations		
Tables and patterns		
Drawing diagrams		
Writing equations involving missing addends		
Using ratios to solve problems		
Finding averages		
Writing equations involving missing factors		
Using formulas to find area		
Using formulas to find volume		

Problem Solving

SCOPE AND SEQUENCE



Using formulas to find circumference

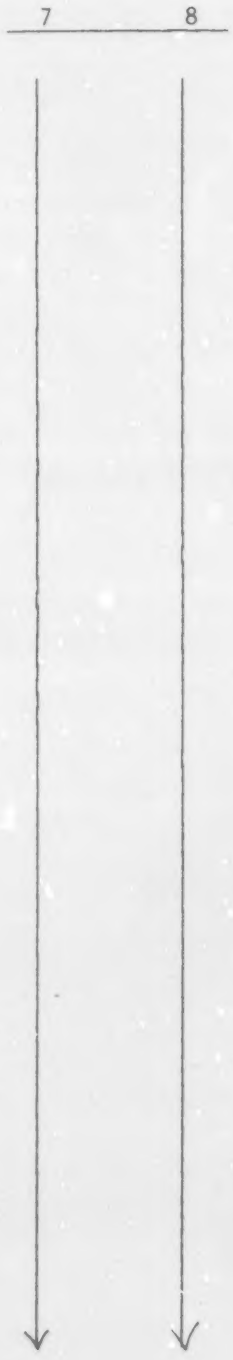
Making graphs

Percent

MATHEMATICS

Applications

SCOPE AND SEQUENCE



Money: penny

Making bar graphs

Logical reasoning

Completing patterns

Earning and spending

Completing and interpreting bar graphs

Recording data and making conclusions

Calendar

Telling time: hour, half-hour

Ordered pairs: locate positions on a grid

Counting by ones, tens, fives, twos

Money: nickel, dime

Counting money

Number-line sequences

Counting sequences

Number patterns

Function tables

Common attributes

Puzzles

Interpreting pictographs

Money: quarter

Time: quarter hour

Finding shortest path

Applications

SCOPE AND SEQUENCE

	7	8
Codes	↓	↓
Cross-number puzzles	↓	↓
Money: half-dollar, dollar	↓	↓
Time: five minutes	↓	↓
Earth science	↓	↓
Biology	↓	↓
Transportation	↓	↓
Literature and adventure	↓	↓
Sports and leisure time	↓	↓
Magic square and figurate numbers	↓	↓
Recording data and drawing conclusions	↓	↓
Averages	↓	↓
Scale drawing	↓	↓
Geography	↓	↓
History	↓	↓
Space	↓	↓
Careers	↓	↓
Number tricks	↓	↓
Line graphs	↓	↓
Maps and scale drawings	↓	↓
Writing fractions for experiments	↓	↓
Making predicitons	↓	↓
Games and clock arithmetic	↓	↓
Circle graphs	↓	↓

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

GRADE NINE

The mathematics course offered on the ninth grade level is first year algebra. The student in an elementary algebra class shall gain sufficient background in algebra so that he/she may be better prepared to study further high school mathematics

Among the topics to be studied in the course are the following:

1. Sets and the real number system
2. The language of Algebra
3. Adding and multiplying real numbers
4. Solving equations and verbal problems
5. Solving inequalities
6. Operations with polynomials
7. Factorization
8. Algebraic fractions
9. Graphing of equations
10. Systems of equations in two variables
11. Rational and irrational numbers
12. Quadratic equations
13. The use of the Quadratic Formula

Recognizing the individual differences in the make-up of classes, greater emphasis on certain topics is a possibility. A final examination should be administered by each teacher for the purpose of testing the achievement of classes

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Algebra

GRADE NINE

1. Geometry Topics

   Lines and angles
   Pairs of angles
   Triangles
   Similar triangles
   Solving right triangles
   Trigonometric ratios and tables
   Applications of trigonometry
   Applications of geometry
   Formulas of geometry
   Geometric interpretations of square roots

2. Sets

   Subsets
   Intersection and union of sets
   Graph of set

3. System of Numeration

   The set of real numbers
   Square roots
   Integers
   Exponents

4. Order

   Order and betweeness
   Properties of inequalities
   Transforming inequalities
   Order of operations
   Properties: commutative, associative, and distributive

5. Addition and Subtraction

   Addition and subtraction on the number line
   Rules for addition of integers
   Opposites and absolute values
   Properties of addition and subtraction of integers
   Addition and subtraction of algebraic fractions
   Addition of polynomials
   Solving simultaneous equation by addition and subtraction method
   Addition and subtraction of radicals
   Transforming equations by addition
   Transforming equations by subtraction

Algebra

GRADE NINE

6. Multiplication and Division

   Factoring
   Exponents
   Rules of multiplication and division of real numbers
   Distributive property
   Transforming equations by multiplication
   Transforming equations by division
   Multiplication and division of fractions
   Multiplication and division of monomials and polynomials
   Solving systems of equations using multiplication
   Multiplication and division of radicals

7. Pairs of Numbers

   Coordinates in a plane
   Graphing a linear equation
   Slope of a line
   Slope-intercept from of a linear equation

8. Fractions Operations

   Fractional equations
   Ratio, percent, and proportions
   Percent mixture problems
   Investment problems
   Uniform motion problems
   Rate of work problems

9. Consumer Problems

   Solving dry mixture problems
   Solving number relations problems
   Digit problems
   Work problems
   Investment and loan problems
   Percent and mixture problems

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Geometry

Geometry is the major tenth grade course offered. Most college preparatory students take only two years of mathematics and this completes their mathematics requirements for most colleges. Three levels are offered to provide a course which is challenging but not defeating to each student. Course content is the same in all levels, differing only in the depth of their understanding of the concepts

The following topics are to be studied:

1. Sets of points and basic relationships
2. Proof
3. Parallel lines and planes
4. Congruent triangles
5. Polygons
6. Quadrilaterals
7. Similar triangles
8. Circles
9. Areas of plane figures
10. Coordinate geometry
11. Lucas
12. Inequalities
13. Space geometry

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Pre-Algebra and Algebra I 306

These two courses cover in two years the material listed for regular algebra I. This sequence was designed for students who require time to learn abstract concepts

Algebra I 395

Same as described in ninth grade course

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Basic Mathematics

Basic mathematics is offered as a remedial course for those students who still need to correct some arithmetic deficiencies. The main emphasis is on the addition, subtraction, multiplication, and division of whole numbers, common fractions, and decimal fractions. The use of percent is also an important part of this course. Other practical mathematical uses are introduced as much as possible.

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Technical Mathematics

The course called technical mathematics is designed to improve the mathematical understanding of those who had difficulty in Algebra I

The topics are listed below:

1. Natural numbers
2. Rational numbers
3. Decimal fractions
4. Mathematical sentences
5. Graphs and statistics
6. Measurement
7. Geometry
8. Area and volume
9. Money management

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Algebra II

A second year of algebra is offered as the major course for the junior year. It reviews and expands the topics begun in the first year course

The following topics are to be presented:

1. Linear equations and inequalities
2. Absolute value
3. Problem solving
4. Polynomials and factors
5. Real numbers and their properties
6. Quadratic equations
7. Linear sentences
8. Analytic geometry
9. Functions and relations
10. Conic sections
11. Systems of equations and inequalities
12. Progressions and series
13. Logarithms and logarithmic equations

If time permits, the following topics are optional choices:

1. Trigonometric functions
2. Graphs and identities of trigonometry
3. Solving triangles

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Informal Geometry

A course in informal geometry is offered to students who have followed the two year Algebra I program. The topics covered are basically the same as in formal geometry, but the approach is inductive and based on experiences in drawing and observation

An outline of topics is listed below:

1. Points, lines, and angles
2. Proof (simple)
3. Triangles
4. Congruence
5. Polygons
6. Areas
7. Ratio and proportion
8. Similar polygons
9. Circles
10. Solids
11. Right triangles
12. Coordinate geometry

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

College Algebra and Trigonometry

The course in college algebra and trigonometry is offered for students who have participated in the honors program and are preparing to take an advanced placement course in their senior year

Course topics are listed below:

1. Sets
2. Permutations, combinations, and probability
3. Measures of geometric figures
4. Circular functions and graphs
5. Number systems
6. Linear and quadratic expressions
7. Polynomials
8. Special functions
9. Series, sequences, and limits
10. Vectors
11. Matrices

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Computer Science

This course is offered as an enrichment course for juniors and seniors who would like to become more familiar with all aspects of computers. Students become involved in both the hardware and software parts of the computer activities

The following topics are emphasized:

1. All computer languages
2. Simulations
3. Games
4. Building components
5. Preparing programs for new computers

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Computer Mathematics

This half credit course is offered for students who would like to explore the use of computers in mathematical pursuits which are not included in the regular curriculum

1. Programming in Basic
2. Solving third and higher degree equations
3. Statistical analysis
4. Business applications
5. Compound interest tables
6. Annuities
7. Probability
8. Simulations

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Mathematical Analysis

This course is offered to complete the precalculus preparation for students who are planning careers which require a strong mathematical background. Topics learned in previous courses are presented in new settings with new concepts to round out the mathematics background

The following topics are presented:

1. Number theory
2. Functions and relations
3. Circular functions
4. Trigonometry
5. Sequences and series
6. Limits
7. Vectors and matrices
8. Linear transformations
9. Systems of linear equations
10. Conic sections
11. Graphs in three-space
12. Programming and using the computer

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Consumer Mathematics

A course in consumer mathematics is offered for seniors who would like to become familiar with the mathematics required for everyday living. This is a half credit course

Topics covered are:

1. Earning money
2. Budgeting
3. Buying food
4. Purchasing or renting automobiles
5. Purchasing or renting homes
6. Buying clothing
7. Banking activities
8. Income taxes and social security
9. Stocks, bonds, and annuities
10. Insurance

COURSE OF STUDY

PROGRAM GOALS FOR MATHEMATICS

Calculus

Advance placement calculus is offered for those who are ready to undertake college level mathematics

Calculus covers the following topics:

1. Rate of change
2. Derivatives of algebraic functions
3. Limits
4. Applications of derivatives
5. Integration
6. The definite integral
7. Transcendental functions
8. Hyperbolic functions
9. Integration methods
10. Plane analytic geometry
11. Polar coordinates
12. Vectors
13. Linear algebra
14. Vector functions
15. Partial differentiation
16. Multiple integrals
17. Vector analysis
18. Infinite series
19. Complex numbers and functions
20. Differential equations

GRADED COURSE OF STUDY

MATHEMATICS

SCOPE AND SEQUENCE

(9 - 12)

MATHEMATICS

SCOPE AND SEQUENCE

Ninth Grade	Tenth Grade	Eleventh Grade	Twelfth Grade
Pre-Algebra	X	X	X
Algebra I	X	X	X
	Geometry	X	X
	Basic Mathematics	X	X
	Technical Mathematics	X	X
		Algebra II	X
		Informal Geometry	X
		College Algebra/Trig.	X
		Computer Science	X
		Computer Mathematics	X
			Mathematical Analysis
			Consumer Mathematics
			Calculus

GRADED COURSE OF STUDY

MATHEMATICS

EVALUATION

1. Teacher-made criterion reference tests
2. Teacher-made mathematics-type essay tests
3. Standardized mathematics achievement tests
4. Diagnostic mathematics tests
5. Commercial textbook related tests
6. Periodic system-wide evaluation of the mathematics program
7. Basic facts test (elementary)
8. Departmental annual student evaluation (secondary)